HP ProLiant DL140 Generation 3 Server

Maintenance and Service Guide

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Audience assumptions

This guide is for an experienced service technician. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels and are familiar with weight and stability precautions for rack installations.

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Customer self repair

HP products are designed with many Customer Self Repair (CSR) parts to minimize repair time and allow for greater flexibility in performing defective parts replacement. If during the diagnosis period HP (or HP service providers or service partners) identifies that the repair can be accomplished by the use of a CSR part, HP will ship that part directly to you for replacement. There are two categories of CSR parts:

- **Mandatory**—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.
- **Optional**—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

NOTE: Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

Based on availability and where geography permits, CSR parts will be shipped for next business day delivery. Same day or four-hour delivery may be offered at an additional charge where geography permits. If assistance is required, you can call the HP Technical Support Center and a technician will help you over the telephone. HP specifies in the materials shipped with a replacement CSR part whether a defective part must be returned to HP. In cases where it is required to return the defective part to HP, you must ship the defective part back to HP within a defined period of time, normally five (5) business days. The defective part must be returned with the associated documentation in the provided shipping material. Failure to return the defective part may result in HP billing you for the replacement. With a customer self repair, HP will pay all shipping and part return costs and determine the courier/carrier to be used.

For more information about HP's Customer Self Repair program, contact your local service provider. For the North American program, refer to the HP website (**http://www.hp.com/go/selfrepair**).

Parts only warranty service

Your HP Limited Warranty may include a parts only warranty service. Under the terms of parts only warranty service, HP will provide replacement parts free of charge.

For parts only warranty service, CSR part replacement is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.

Réparation par le client (CSR)

Les produits HP comportent de nombreuses pièces CSR (Customer Self Repair = réparation par le client) afin de minimiser les délais de réparation et faciliter le remplacement des pièces défectueuses. Si pendant la période de diagnostic, HP (ou ses partenaires ou mainteneurs agréés) détermine que la réparation peut être effectuée à l'aide d'une pièce CSR, HP vous l'envoie directement. Il existe deux catégories de pièces CSR:

- **Obligatoire** - Pièces pour lesquelles la réparation par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.
- **Facultatif** - Pièces pour lesquelles la réparation par le client est facultative. Ces pièces sont également conçues pour permettre au client d'effectuer lui-même la réparation. Toutefois, si vous demandez à HP de remplacer ces pièces, l'intervention peut ou non vous être facturée, selon le type de garantie applicable à votre produit.

REMARQUE: Certaines pièces HP ne sont pas conçues pour permettre au client d'effectuer lui-même la réparation. Pour que la garantie puisse s'appliquer, HP exige que le remplacement de la pièce soit effectué par un Mainteneur Agréé. Ces pièces sont identifiées par la mention "Non" dans le Catalogue illustré.

Les pièces CSR sont livrées le jour ouvré suivant, dans la limite des stocks disponibles et selon votre situation géographique. Si votre situation géographique le permet et que vous demandez une livraison le jour même ou dans les 4 heures, celle-ci vous sera facturée. Pour bénéficier d'une assistance téléphonique, appelez le Centre d'assistance technique HP. Dans les documents envoyés avec la pièce de rechange CSR, HP précise s'il est nécessaire de lui retourner la pièce défectueuse. Si c'est le cas, vous devez le faire dans le délai indiqué, généralement cinq (5) jours ouvrés. La pièce et sa documentation doivent être retournées dans l'emballage fourni. Si vous ne retournez pas la pièce défectueuse, HP se réserve le droit de vous facturer les coûts de remplacement. Dans le cas d'une pièce CSR, HP supporte l'ensemble des frais d'expédition et de retour, et détermine la société de courses ou le transporteur à utiliser.

Pour plus d'informations sur le programme CSR de HP, contactez votre Mainteneur Agrée local. Pour plus d'informations sur ce programme en Amérique du Nord, consultez le site Web HP (**http://www.hp.com/go/selfrepair**).

Service de garantie "pièces seules"

Votre garantie limitée HP peut inclure un service de garantie "pièces seules". Dans ce cas, les pièces de rechange fournies par HP ne sont pas facturées.

Dans le cadre de ce service, la réparation des pièces CSR par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.

Riparazione da parte del cliente

Per abbreviare i tempi di riparazione e garantire una maggiore flessibilità nella sostituzione di parti difettose, i prodotti HP sono realizzati con numerosi componenti che possono essere riparati direttamente dal cliente (CSR, Customer Self Repair). Se in fase di diagnostica HP (o un centro di servizi o di assistenza HP) identifica il guasto come riparabile mediante un ricambio CSR, HP lo spedirà direttamente al cliente per la sostituzione. Vi sono due categorie di parti CSR:

- **Obbligatorie** – Parti che devono essere necessariamente riparate dal cliente. Se il cliente ne affida la riparazione ad HP, deve sostenere le spese di spedizione e di manodopera per il servizio.
- **Opzionali** – Parti la cui riparazione da parte del cliente è facoltativa. Si tratta comunque di componenti progettati per questo scopo. Se tuttavia il cliente ne richiede la sostituzione ad HP, potrebbe dover sostenere spese addizionali a seconda del tipo di garanzia previsto per il prodotto.

NOTA: alcuni componenti HP non sono progettati per la riparazione da parte del cliente. Per rispettare la garanzia, HP richiede che queste parti siano sostituite da un centro di assistenza autorizzato. Tali parti sono identificate da un "No" nel Catalogo illustrato dei componenti.

In base alla disponibilità e alla località geografica, le parti CSR vengono spedite con consegna entro il giorno lavorativo seguente. La consegna nel giorno stesso o entro quattro ore è offerta con un supplemento di costo solo in alcune zone. In caso di necessità si può richiedere l'assistenza telefonica di un addetto del centro di supporto tecnico HP. Nel materiale fornito con una parte di ricambio CSR, HP specifica se il cliente deve restituire dei componenti. Qualora sia richiesta la resa ad HP del componente difettoso, lo si deve spedire ad HP entro un determinato periodo di tempo, generalmente cinque (5) giorni lavorativi. Il componente difettoso deve essere restituito con la documentazione associata nell'imballo di spedizione fornito. La mancata restituzione del componente può comportare la fatturazione del ricambio da parte di HP. Nel caso di riparazione da parte del cliente, HP sostiene tutte le spese di spedizione e resa e sceglie il corriere/vettore da utilizzare.

Per ulteriori informazioni sul programma CSR di HP contattare il centro di assistenza di zona. Per il programma in Nord America fare riferimento al sito Web HP (**http://www.hp.com/go/selfrepair**).

Servizio di garanzia per i soli componenti

La garanzia limitata HP può includere un servizio di garanzia per i soli componenti. Nei termini di garanzia del servizio per i soli componenti, HP fornirà gratuitamente le parti di ricambio.

Per il servizio di garanzia per i soli componenti è obbligatoria la formula CSR che prevede la riparazione da parte del cliente. Se il cliente invece richiede la sostituzione ad HP, dovrà sostenere le spese di spedizione e di manodopera per il servizio.

Customer Self Repair

HP Produkte enthalten viele CSR-Teile (Customer Self Repair), um Reparaturzeiten zu minimieren und höhere Flexibilität beim Austausch defekter Bauteile zu ermöglichen. Wenn HP (oder ein HP Servicepartner) bei der Diagnose feststellt, dass das Produkt mithilfe eines CSR-Teils repariert werden kann, sendet Ihnen HP dieses Bauteil zum Austausch direkt zu. CSR-Teile werden in zwei Kategorien unterteilt:

- **Zwingend –** Teile, für die das Customer Self Repair-Verfahren zwingend vorgegeben ist. Wenn Sie den Austausch dieser Teile von HP vornehmen lassen, werden Ihnen die Anfahrt- und Arbeitskosten für diesen Service berechnet.
- **Optional –** Teile, für die das Customer Self Repair-Verfahren optional ist. Diese Teile sind auch für Customer Self Repair ausgelegt. Wenn Sie jedoch den Austausch dieser Teile von HP vornehmen lassen möchten, können bei diesem Service je nach den für Ihr Produkt vorgesehenen Garantiebedingungen zusätzliche Kosten anfallen.

HINWEIS: Einige Teile sind nicht für Customer Self Repair ausgelegt. Um den Garantieanspruch des Kunden zu erfüllen, muss das Teil von einem HP Servicepartner ersetzt werden. Im illustrierten Teilekatalog sind diese Teile mit „No" bzw. „Nein" gekennzeichnet.

CSR-Teile werden abhängig von der Verfügbarkeit und vom Lieferziel am folgenden Geschäftstag geliefert. Für bestimmte Standorte ist eine Lieferung am selben Tag oder innerhalb von vier Stunden gegen einen Aufpreis verfügbar. Wenn Sie Hilfe benötigen, können Sie das HP technische Support Center anrufen und sich von einem Mitarbeiter per Telefon helfen lassen. Den Materialien, die mit einem CSR-Ersatzteil geliefert werden, können Sie entnehmen, ob das defekte Teil an HP zurückgeschickt werden muss. Wenn es erforderlich ist, das defekte Teil an HP zurückzuschicken, müssen Sie dies innerhalb eines vorgegebenen Zeitraums tun, in der Regel innerhalb von fünf (5) Geschäftstagen. Das defekte Teil muss mit der zugehörigen Dokumentation in der Verpackung zurückgeschickt werden, die im Lieferumfang enthalten ist. Wenn Sie das defekte Teil nicht zurückschicken, kann HP Ihnen das Ersatzteil in Rechnung stellen. Im Falle von Customer Self Repair kommt HP für alle Kosten für die Lieferung und Rücksendung auf und bestimmt den Kurier-/Frachtdienst.

Weitere Informationen über das HP Customer Self Repair Programm erhalten Sie von Ihrem Servicepartner vor Ort. Informationen über das CSR-Programm in Nordamerika finden Sie auf der HP Website unter (**http://www.hp.com/go/selfrepair**).

Parts-only Warranty Service (Garantieservice ausschließlich für Teile)

Ihre HP Garantie umfasst möglicherweise einen Parts-only Warranty Service (Garantieservice ausschließlich für Teile). Gemäß den Bestimmungen des Parts-only Warranty Service stellt HP Ersatzteile kostenlos zur Verfügung.

Für den Parts-only Warranty Service ist das CSR-Verfahren zwingend vorgegeben. Wenn Sie den Austausch dieser Teile von HP vornehmen lassen, werden Ihnen die Anfahrt- und Arbeitskosten für diesen Service berechnet.

Reparaciones del propio cliente

Los productos de HP incluyen muchos componentes que el propio usuario puede reemplazar (*Customer Self Repair*, CSR) para minimizar el tiempo de reparación y ofrecer una mayor flexibilidad a la hora de realizar sustituciones de componentes defectuosos. Si, durante la fase de diagnóstico, HP (o los proveedores o socios de servicio de HP) identifica que una reparación puede llevarse a cabo mediante el uso de un componente CSR, HP le enviará dicho componente directamente para que realice su sustitución. Los componentes CSR se clasifican en dos categorías:

- **Obligatorio:** componentes para los que la reparación por parte del usuario es obligatoria. Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.
- **Opcional:** componentes para los que la reparación por parte del usuario es opcional. Estos componentes también están diseñados para que puedan ser reparados por el usuario. Sin embargo, si precisa que HP realice su sustitución, puede o no conllevar costes adicionales, dependiendo del tipo de servicio de garantía correspondiente al producto.

NOTA: Algunos componentes no están diseñados para que puedan ser reparados por el usuario. Para que el usuario haga valer su garantía, HP pone como condición que un proveedor de servicios autorizado realice la sustitución de estos componentes. Dichos componentes se identifican con la palabra "No" en el catálogo ilustrado de componentes.

Según la disponibilidad y la situación geográfica, los componentes CSR se enviarán para que lleguen a su destino al siguiente día laborable. Si la situación geográfica lo permite, se puede solicitar la entrega en el mismo día o en cuatro horas con un coste adicional. Si precisa asistencia técnica, puede llamar al Centro de asistencia técnica de HP y recibirá ayuda telefónica por parte de un técnico. Con el envío de materiales para la sustitución de componentes CSR, HP especificará si los componentes defectuosos deberán devolverse a HP. En aquellos casos en los que sea necesario devolver algún componente a HP, deberá hacerlo en el periodo de tiempo especificado, normalmente cinco días laborables. Los componentes defectuosos deberán devolverse con toda la documentación relacionada y con el embalaje de envío. Si no enviara el componente defectuoso requerido, HP podrá cobrarle por el de sustitución. En el caso de todas sustituciones que lleve a cabo el cliente, HP se hará cargo de todos los gastos de envío y devolución de componentes y escogerá la empresa de transporte que se utilice para dicho servicio.

Para obtener más información acerca del programa de Reparaciones del propio cliente de HP, póngase en contacto con su proveedor de servicios local. Si está interesado en el programa para Norteamérica, visite la página web de HP siguiente (**http://www.hp.com/go/selfrepair**).

Servicio de garantía exclusivo de componentes

La garantía limitada de HP puede que incluya un servicio de garantía exclusivo de componentes. Según las condiciones de este servicio exclusivo de componentes, HP le facilitará los componentes de repuesto sin cargo adicional alguno.

Para este servicio de garantía exclusivo de componentes, es obligatoria la sustitución de componentes por parte del usuario (CSR). Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.

Customer Self Repair

Veel onderdelen in HP producten zijn door de klant zelf te repareren, waardoor de reparatieduur tot een minimum beperkt kan blijven en de flexibiliteit in het vervangen van defecte onderdelen groter is. Deze onderdelen worden CSR-onderdelen (Customer Self Repair) genoemd. Als HP (of een HP Service Partner) bij de diagnose vaststelt dat de reparatie kan worden uitgevoerd met een CSR-onderdeel, verzendt HP dat onderdeel rechtstreeks naar u, zodat u het defecte onderdeel daarmee kunt vervangen. Er zijn twee categorieën CSR-onderdelen:

- **Verplicht:** Onderdelen waarvoor reparatie door de klant verplicht is. Als u HP verzoekt deze onderdelen voor u te vervangen, worden u voor deze service reiskosten en arbeidsloon in rekening gebracht.
- **Optioneel:** Onderdelen waarvoor reparatie door de klant optioneel is. Ook deze onderdelen zijn ontworpen voor reparatie door de klant. Als u echter HP verzoekt deze onderdelen voor u te vervangen, kunnen daarvoor extra kosten in rekening worden gebracht, afhankelijk van het type garantieservice voor het product.

OPMERKING: Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

Afhankelijk van de leverbaarheid en de locatie worden CSR-onderdelen verzonden voor levering op de eerstvolgende werkdag. Levering op dezelfde dag of binnen vier uur kan tegen meerkosten worden aangeboden, indien dit mogelijk is gezien de locatie. Indien assistentie gewenst is, belt u een HP Service Partner om via de telefoon technische ondersteuning te ontvangen. HP vermeldt in de documentatie bij het vervangende CSR-onderdeel of het defecte onderdeel aan HP moet worden geretourneerd. Als het defecte onderdeel aan HP moet worden teruggezonden, moet u het defecte onderdeel binnen een bepaalde periode, gewoonlijk vijf (5) werkdagen, retourneren aan HP. Het defecte onderdeel moet met de bijbehorende documentatie worden geretourneerd in het meegeleverde verpakkingsmateriaal. Als u het defecte onderdeel niet terugzendt, kan HP u voor het vervangende onderdeel kosten in rekening brengen. Bij reparatie door de klant betaalt HP alle verzendkosten voor het vervangende en geretourneerde onderdeel en kiest HP zelf welke koerier/transportonderneming hiervoor wordt gebruikt.

Neem contact op met een Service Partner voor meer informatie over het Customer Self Repair programma van HP. Informatie over Service Partners vindt u op de HP website (**http://www.hp.nl/services/servicepartners**).

Garantieservice "Parts Only"

Het is mogelijk dat de HP garantie alleen de garantieservice "Parts Only" omvat. Volgens de bepalingen van de Parts Only garantieservice zal HP kosteloos vervangende onderdelen ter beschikking stellen.

Voor de Parts Only garantieservice is vervanging door CSR-onderdelen verplicht. Als u HP verzoekt deze onderdelen voor u te vervangen, worden u voor deze service reiskosten en arbeidsloon in rekening gebracht.

Reparo feito pelo cliente

Os produtos da HP são projetados com muitas peças para reparo feito pelo cliente (CSR) de modo a minimizar o tempo de reparo e permitir maior flexibilidade na substituição de peças com defeito. Se, durante o período de diagnóstico, a HP (ou fornecedores/parceiros de serviço da HP) concluir que o reparo pode ser efetuado pelo uso de uma peça CSR, a peça de reposição será enviada diretamente ao cliente. Existem duas categorias de peças CSR:

- **Obrigatória** – Peças cujo reparo feito pelo cliente é obrigatório. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.
- **Opcional** – Peças cujo reparo feito pelo cliente é opcional. Essas peças também são projetadas para o reparo feito pelo cliente. No entanto, se desejar que a HP as substitua, pode haver ou não a cobrança de taxa adicional, dependendo do tipo de serviço de garantia destinado ao produto.

OBSERVAÇÃO: Algumas peças da HP não são projetadas para o reparo feito pelo cliente. A fim de cumprir a garantia do cliente, a HP exige que um técnico autorizado substitua a peça. Essas peças estão identificadas com a marca "No" (Não), no catálogo de peças ilustrado.

Conforme a disponibilidade e o local geográfico, as peças CSR serão enviadas no primeiro dia útil após o pedido. Onde as condições geográficas permitirem, a entrega no mesmo dia ou em quatro horas pode ser feita mediante uma taxa adicional. Se precisar de auxílio, entre em contato com o Centro de suporte técnico da HP para que um técnico o ajude por telefone. A HP especifica nos materiais fornecidos com a peça CSR de reposição se a peça com defeito deve ser devolvida à HP. Nos casos em que isso for necessário, é preciso enviar a peça com defeito à HP dentro do período determinado, normalmente cinco (5) dias úteis. A peça com defeito deve ser enviada com a documentação correspondente no material de transporte fornecido. Caso não o faça, a HP poderá cobrar a reposição. Para as peças de reparo feito pelo cliente, a HP paga todas as despesas de transporte e de devolução da peça e determina a transportadora/serviço postal a ser utilizado.

Para obter mais informações sobre o programa de reparo feito pelo cliente da HP, entre em contato com o fornecedor de serviços local. Para o programa norte-americano, visite o site da HP (**http://www.hp.com/go/selfrepair**).

Serviço de garantia apenas para peças

A garantia limitada da HP pode incluir um serviço de garantia apenas para peças. Segundo os termos do serviço de garantia apenas para peças, a HP fornece as peças de reposição sem cobrar nenhuma taxa.

No caso desse serviço, a substituição de peças CSR é obrigatória. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.

顧客自己修理保証サービス

修理時間を短縮し、故障部品の交換における高い柔軟性を確保するために、HP製品には多数の顧客自己修理（CSR）部品があります。診断の際に、CSR部品を使用すれば修理ができるとHP（HPまたはHP正規保守代理店）が判断した場合、HPはその部品を直接、お客様に発送し、お客様に交換していただきます。CSR部品には以下の2通りがあります。

- 必須 - 顧客自己修理が必須の部品。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費がお客様に請求されます。
- 任意 - 顧客自己修理が任意である部品。この部品も顧客自己修理用です。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、お買い上げの製品に適用される保証サービス内容の範囲内においては、別途費用を負担していただくことなく保証サービスを受けることができます。

注： HP製品の一部の部品は、顧客自己修理用ではありません。製品の保証を継続するためには、HPまたはHP正規保守代理店による交換作業が必須となります。部品カタログには、当該部品が顧客自己修理除外品である旨が記載されています。

部品供給が可能な場合、地域によっては、CSR部品を翌営業日に届くように発送します。また、地域によっては、追加費用を負担いただくことにより同日または4時間以内に届くように発送することも可能な場合があります。サポートが必要なときは、HPの修理受付窓口に電話していただければ、技術者が電話でアドバイスします。交換用のCSR部品または同梱物には、故障部品をHPに返送する必要があるかどうかが表示されています。故障部品をHPに返送する必要がある場合は、指定期限内（通常は5営業日以内）に故障部品をHPに返送してください。故障部品を返送する場合は、届いた時の梱包箱に関連書類とともに入れてください。故障部品を返送しない場合、HPから部品費用が請求されます。顧客自己修理の際には、HPは送料および部品返送費を全額負担し、使用する宅配便会社や運送会社を指定します。

部品のみ保証サービス

HP保証サービスには、部品のみ保証サービスが適用される場合があります。このサービスでは、交換部品は無償で提供されます。

部品のみ保証サービスにおいては、CSR部品をお客様により交換作業していただくことが必須となります。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費はお客様の負担となります。

客户自行维修

HP 产品提供许多客户自行维修 (CSR) 部件，以尽可能缩短维修时间和在更换缺陷部件方面提供更大的灵活性。如果在诊断期间 HP（或 HP 服务提供商或服务合作伙伴）确定可以通过使用 CSR 部件完成维修，HP 将直接把该部件发送给您进行更换。有两类 CSR 部件：

- **强制性的** — 要求客户必须自行维修的部件。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。
- **可选的** — 客户可以选择是否自行维修的部件。这些部件也是为客户自行维修设计的。不过，如果您要求 HP 为您更换这些部件，则根据为您的产品指定的保修服务类型，HP 可能收取或不再收取任何附加费用。

注：某些 HP 部件的设计并未考虑客户自行维修。为了满足客户保修的需要，HP 要求授权服务提供商更换相关部件。这些部件在部件图解目录中标记为“否”。

CSR 部件将在下一个工作日发运（取决于备货情况和允许的地理范围）。在允许的地理范围内，可在当天或四小时内发运，但要收取额外费用。如果需要帮助，您可以致电 HP 技术支持中心，将会有技术人员通过电话为您提供帮助。HP 会在随更换的 CSR 部件发运的材料中指明是否必须将有缺陷的部件返还给 HP。如果要求您将有缺陷的部件返还给 HP，那么您必须在规定期限内（通常是五 (5) 个工作日）将缺陷部件发给 HP。有缺陷的部件必须随所提供的发运材料中的相关文件一起返还。如果未能送还有缺陷的部件，HP 可能会要求您支付更换费用。客户自行维修时，HP 将承担所有相关运输和部件返回费用，并指定快递商/承运商。

有关 HP 客户自行维修计划的详细信息，请与您当地的服务提供商联系。有关北美地区的计划，请访问 HP 网站 (http://www.hp.com/go/selfrepair)。

仅部件保修服务

您的 HP 有限保修服务可能涉及仅部件保修服务。根据仅部件保修服务条款的规定，HP 将免费提供更换的部件。

仅部件保修服务要求进行 CSR 部件更换。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。

客戶自行維修

HP 產品設計了許多「客戶自行維修」(CSR) 的零件以減少維修時間，並且使得更換瑕疵零件時能有更大的彈性。如果在診斷期間 HP（或 HP 服務供應商或維修夥伴）辨認出此項維修工作可以藉由使用 CSR 零件來完成，則 HP 將直接寄送該零件給您作更換。CSR 零件分為兩種類別：

- **強制的** — 客戶自行維修所使用的零件是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。
- **選購的** — 客戶自行維修所使用的零件是選購的。這些零件也設計用於客戶自行維修之用。不過，如果您要求 HP 為您更換，則可能需要也可能不需要負擔額外的費用，端視針對此產品指定的保固服務類型而定。

備註：某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

基於材料取得及環境允許的情況下，CSR 零件將於下一個工作日以快遞寄送。在環境的允許下當天或四小時內送達，則可能需要額外的費用。若您需要協助，可致電「HP 技術支援中心」，會有一位技術人員透過電話來協助您。不論損壞的零件是否必須退回，HP 皆會在與 CSR 替換零件一起運送的材料中註明。若要將損壞的零件退回 HP，您必須在指定的一段時間內（通常為五 (5) 個工作天），將損壞的零件寄回 HP。損壞的零件必須與寄送資料中隨附的相關技術文件一併退還。如果無法退還損壞的零件，HP 可能要向您收取替換費用。針對客戶自行維修情形，HP 將負責所有運費及零件退還費用並指定使用何家快遞/貨運公司。

如需 HP 的「客戶自行維修」方案詳細資訊，請連絡您當地的服務供應商。至於北美方案，請參閱 HP 網站 (http://www.hp.com/go/selfrepair)。

僅限零件的保固服務

您的「HP 有限保固」可能包含僅限零件的保固服務。在僅限零件的保固服務情況下，HP 將免費提供替換零件。

針對僅限零件的保固服務，CSR 零件替換是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。

고객 셀프 수리

HP 제품은 수리 시간을 최소화하고 결함이 있는 부품 교체 시 더욱 융통성을 발휘할 수 있도록 하기 위해 고객 셀프 수리(CSR) 부품을 다량 사용하여 설계되었습니다. 진단 기간 동안 HP(또는 HP 서비스 공급업체 또는 서비스 협력업체)에서 CSR 부품을 사용하여 수리가 가능하다고 판단되면 HP는 해당 부품을 바로 사용자에게 보내어 사용자가 교체할 수 있도록 합니다. CSR 부품에는 두 가지 종류가 있습니다.

- **고객 셀프 수리가 의무 사항인 필수 부품.** 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.
- **고객 셀프 수리가 선택 사항인 부품.** 이 부품들도 고객 셀프 수리가 가능하도록 설계되었습니다. 하지만 사용자가 HP에 이 부품의 교체를 요청할 경우 사용자가 구입한 제품에 해당하는 보증 서비스 유형에 따라 추가 비용 없이 교체가 가능할 수 있습니다.

참고: 일부 HP 부품은 고객 셀프 수리가 불가능하도록 설계되었습니다. HP는 만족스러운 고객 보증을 위해 공인 서비스 제공업체를 통해 부품을 교체하도록 하고 있습니다. 이러한 부품들은 Illustrated Parts Catalog에 "No"라고 표시되어 있습니다.

CSR 부품은 재고 상태와 지리적 조건이 허용하는 경우 다음 영업일 납품이 가능하도록 배송이 이루어집니다. 지리적 조건이 허용하는 경우 추가 비용이 청구되는 조건으로 당일 또는 4시간 배송이 가능할 수도 있습니다. 도움이 필요하시면 HP 기술 지원 센터로 전화하십시오. 전문 기술자가 전화로 도움을 줄 것입니다. HP는 결함이 발생한 부품을 HP로 반환해야 하는지 여부를 CSR 교체 부품과 함께 배송된 자료에 지정합니다. 결함이 발생한 부품을 HP로 반환해야 하는 경우에는 지정된 기간 내(통상 영업일 기준 5일)에 HP로 반환해야 합니다. 이 때 결함이 발생한 부품은 제공된 포장 재료에 넣어 관련 설명서와 함께 반환해야 합니다. 결함이 발생한 부품을 반환하지 않는 경우 HP가 교체 부품에 대해 비용을 청구할 수 있습니다. 고객 셀프 수리의 경우, HP는 모든 운송 및 부품 반환 비용을 부담하며 이용할 운송업체 및 택배 서비스를 결정합니다.

HP 고객 셀프 수리 프로그램에 대한 자세한 내용은 가까운 서비스 제공업체에 문의하십시오. 북미 지역의 프로그램에 대해서는 HP 웹 사이트(http://www.hp.com/go/selfrepair)를 참조하십시오.

부품 제공 보증 서비스

HP 제한 보증에는 부품 제공 보증 서비스가 포함될 수 있습니다. 이러한 경우 HP는 부품 제공 보증 서비스의 조건에 따라 교체 부품만을 무료로 제공합니다.

부품 제공 보증 서비스 제공 시 CSR 부품 교체는 의무 사항입니다. 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.

Illustrated parts catalog

Mechanical components

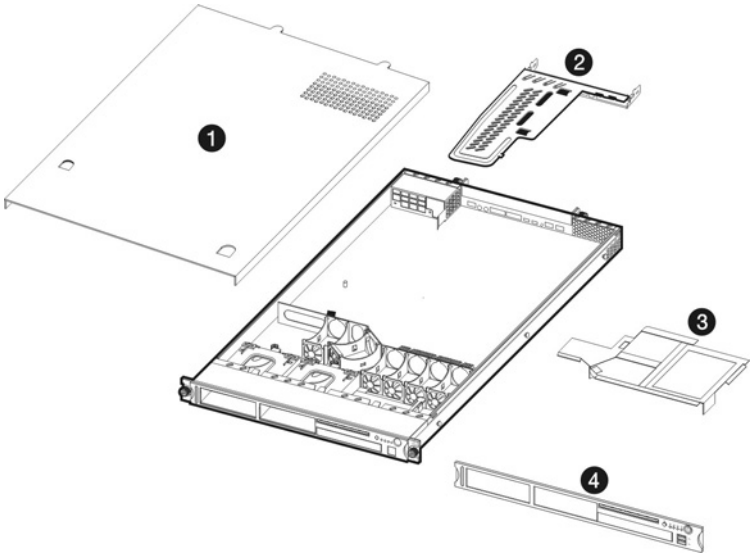


Table 1 Mechanical components spare parts list

Item	Description	Spare part number	Customer self Repair
1	Top cover	416353-001	Mandatory
2	PCI riser board assembly	416345-001	Mandatory
3	Air duct	390981-001	Mandatory
4	Front bezel	416352-001	Mandatory
5	Processor air baffle*	394556-001	Mandatory
6	Processor mounting plate*	390396-001	Mandatory

* not shown

[1]Mandatory—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.

[2]Optional—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

[3]No—Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

[1]Mandatory: Obligatoire—Pièces pour lesquelles la réparation par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.

[2]Optional: Facultatif—Pièces pour lesquelles la réparation par le client est facultative. Ces pièces sont également conçues pour permettre au client d'effectuer lui-même la réparation. Toutefois, si vous demandez à HP de remplacer ces pièces, l'intervention peut ou non vous être facturée, selon le type de garantie applicable à votre produit.

[3]No: Non—Certaines pièces HP ne sont pas conçues pour permettre au client d'effectuer lui-même la réparation. Pour que la garantie puisse s'appliquer, HP exige que le remplacement de la pièce soit effectué par un Mainteneur Agréé. Ces pièces sont identifiées par la mention "Non" dans le Catalogue illustré.

[1]Mandatory: Obbligatorie—Parti che devono essere necessariamente riparate dal cliente. Se il cliente ne affida la riparazione ad HP, deve sostenere le spese di spedizione e di manodopera per il servizio.

[2]Optional: Opzionali—Parti la cui riparazione da parte del cliente è facoltativa. Si tratta comunque di componenti progettati per questo scopo. Se tuttavia il cliente ne richiede la sostituzione ad HP, potrebbe dover sostenere spese addizionali a seconda del tipo di garanzia previsto per il prodotto.

[3]No: Non CSR—Alcuni componenti HP non sono progettati per la riparazione da parte del cliente. Per rispettare la garanzia, HP richiede che queste parti siano sostituite da un centro di assistenza autorizzato. Tali parti sono identificate da un "No" nel Catalogo illustrato dei componenti.

[1]Mandatory: Zwingend—Teile, die im Rahmen des Customer Self Repair Programms ersetzt werden müssen. Wenn Sie diese Teile von HP ersetzen lassen, werden Ihnen die Versand- und Arbeitskosten für diesen Service berechnet.

[2]Optional: Optional—Teile, für die das Customer Self Repair-Verfahren optional ist. Diese Teile sind auch für Customer Self Repair ausgelegt. Wenn Sie jedoch den Austausch dieser Teile von HP vornehmen lassen möchten, können bei diesem Service je nach den für Ihr Produkt vorgesehenen Garantiebedingungen zusätzliche Kosten anfallen.

[3]No: Kein—Einige Teile sind nicht für Customer Self Repair ausgelegt. Um den Garantieanspruch des Kunden zu erfüllen, muss das Teil von einem HP Servicepartner ersetzt werden. Im illustrierten Teilekatalog sind diese Teile mit „No" bzw. „Nein" gekennzeichnet.

[1]Mandatory: Obligatorio—componentes para los que la reparación por parte del usuario es obligatoria. Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.

[2]Optional: Opcional— componentes para los que la reparación por parte del usuario es opcional. Estos componentes también están diseñados para que puedan ser reparados por el usuario. Sin embargo, si precisa que HP realice su sustitución, puede o no conllevar costes adicionales, dependiendo del tipo de servicio de garantía correspondiente al producto.

[3]No: No—Algunos componentes no están diseñados para que puedan ser reparados por el usuario. Para que el usuario haga valer su garantía, HP pone como condición que un proveedor de servicios autorizado realice la sustitución de estos componentes. Dichos componentes se identifican con la palabra "No" en el catálogo ilustrado de componentes.

[1]Mandatory: Verplicht—Onderdelen waarvoor Customer Self Repair verplicht is. Als u HP verzoekt deze onderdelen te vervangen, komen de reiskosten en het arbeidsloon voor uw rekening.

[2]Optional: Optioneel—Onderdelen waarvoor reparatie door de klant optioneel is. Ook deze onderdelen zijn ontworpen voor reparatie door de klant. Als u echter HP verzoekt deze onderdelen voor u te vervangen, kunnen daarvoor extra kosten in rekening worden gebracht, afhankelijk van het type garantieservice voor het product.

[3]No: Nee—Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

[1]Mandatory: Obrigatória—Peças cujo reparo feito pelo cliente é obrigatório. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.

[2]Optional: Opcional—Peças cujo reparo feito pelo cliente é opcional. Essas peças também são projetadas para o reparo feito pelo cliente. No entanto, se desejar que a HP as substitua, pode haver ou não a cobrança de taxa adicional, dependendo do tipo de serviço de garantia destinado ao produto.

[3]No: Nenhuma—Algumas peças da HP não são projetadas para o reparo feito pelo cliente. A fim de cumprir a garantia do cliente, a HP exige que um técnico autorizado substitua a peça. Essas peças estão identificadas com a marca “No” (Não), no catálogo de peças ilustrado.

[1]Mandatory：必須 - 顧客自己修理が必須の部品。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費がお客様に請求されます。

[2]Optional：任意 - 顧客自己修理が任意である部品。この部品も顧客自己修理用です。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、お買い上げの製品に適用される保証サービス内容の範囲内においては、費用を負担していただくことなく保証サービスを受けることができます。

[3]No：除外 - HP製品の一部の部品は、顧客自己修理用ではありません。製品の保証を継続するためには、HPまたはHP正規保守代理店による交換作業が必須となります。部品カタログには、当該部品が顧客自己修理除外品である旨が記載されています。

[1]Mandatory: 强制性的 — 要求客户必须自行维修的部件。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。

[2]Optional: 可选的 — 客户可以选择是否自行维修的部件。这些部件也是为客户自行维修设计的。不过，如果您要求 HP 为您更换这些部件，则根据为您的产品指定的保修服务类型，HP 可能收取或不再收取任何附加费用。

[3]No: 否 — 某些 HP 部件的设计并未考虑客户自行维修。为了满足客户保修的需要，HP 要求授权服务提供商更换相关部件。这些部件在部件图解目录中标记为“否”。

[1]Mandatory: 強制的 — 客戶自行維修所使用的零件是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。

[2]Optional: 選購的 — 客戶自行維修所使用的零件是選購的。這些零件也設計用於客戶自行維修之用。不過，如果您要求 HP 為您更換，則可能需要也可能不需要負擔額外的費用，端視針對此產品指定的保固服務類型而定。

[3]No: 否 — 某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

[1] Mandatory: 필수 — 고객 셀프 수리가 의무 사항인 필수 부품. 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.

[2] Optional: 옵션 — 고객 셀프 수리가 선택 사항인 부품. 이 부품들도 고객 셀프 수리가 가능하도록 설계되었습니다. 하지만 사용자가 HP에 이 부품의 교체를 요청할 경우 사용자가 구입한 제품에 해당하는 보증 서비스 유형에 따라 추가 비용 없이 교체가 가능할 수 있습니다.

[3] No: No — 고객 셀프 수리가 불가능하도록 설계된 HP 부품. 이 부품들은 고객 셀프 수리가 불가능하도록 설계되었습니다. HP는 고객 보증을 만족시키기 위해 공인 서비스 제공업체를 통해 부품을 교체하도록 하고 있습니다.

System components

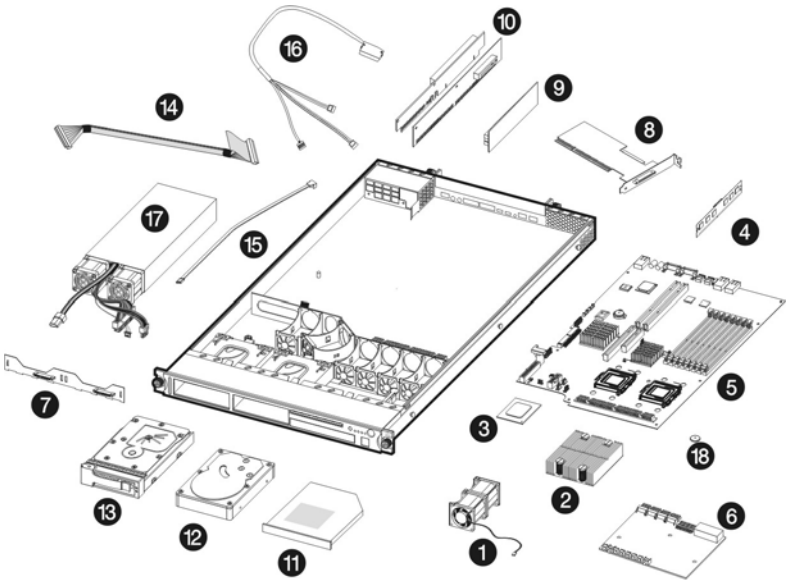


Table 2 System components spare parts list

Item	Description	Spare part number	Customer self repair
1	System fan module	416350-001	Mandatory
2	Processor heat sink	416348-001	Optional
3	Processor		Optional
	Quad-Core Intel Xeon Processors		
	a) E5310 (1.60 GHz, 1066 MHz FSB, 80W)	453310-001	
	b) E5320 (1.86 GHz, 1066 MHz FSB, 80W)*	453309-001	
	c) E5335 (2.0 GHz, 1333 MHz FSB, 80W)*	453307-001	
	d) E5345 (2.33 GHz, 1333 MHz FSB, 80W)*	453308-001	
	e) L5320 LV (1.86 GHz, 1066 MHz FSB, 50W)*	453311-001	
	f) L5335 (2.0 GHz, 1333 MHz FSB, 50W)*	452664-001	
	g) X5355 (2.66 GHz, 1333 MHz FSB, 120W)*	453306-001	
	h) X5365 (3.0 GHz, 1333 MHz FSB, 120W)*	436520-001	
	Dual-Core Intel Xeon Processors		
	a) 5050 (3.00 GHz, 667 MHz FSB, 95W)*	409423-001	
	b) 5060 (3.20 GHz, 1066 MHz FSB, 130W)*	409424-001	
	c) 5080 (3.73 GHz, 1066 MHz FSB, 130W)*	412955-001	
	d) 5110 (1.60 GHz, 1066 MHz FSB, 65W)*	458693-001	
	e) 5130 (2.0 GHz, 1333 MHz FSB, 65W)*	458692-001	
	f) 5140 (2.33 GHz, 1333 MHz FSB, 65W)*	458691-001	
	g) 5148 LV (2.33 GHz, 1333 MHz FSB, 40W)*	458690-001	

Table 2 System components spare parts list

Item	Description	Spare part number	Customer self repair
	h) 5150 (2.66 GHz, 1333 MHz FSB, 65W)*	458689-001	
	i) 5160 (3.0 GHz, 1333 MHz FSB, 80W)*	458688-001	
4	**Memory**		Mandatory
	a) 512 MB DDR2-667MHz FBD	416470-001	
	b) 1 GB DDR2-667MHz FBD*	416471-001	
	c) 2 GB DDR2-667MHz FBD*	416472-001	
	d) 4 GB DDR2-667MHz FBD*	416473-001	
	System boards		
5	System board	440633-001	Optional
6	Front panel board	411749-001	Mandatory
7	Hot-plug backplane board	416347-001	Mandatory
8	Hot-plug SATA/SAS PCI-X controller board	366493-001	Mandatory
9	Low-profile PCI-X riser board	408293-001	Mandatory
10	PCI Express riser boards		Mandatory
	a) Standard height/full-length PCI Express x16 riser board	416346-001	
	b) Low-profile PCI Express x8 riser board	413435-001	
	Mass storage devices		
11	Optical media drive		Mandatory
	a) IDE CD-ROM drive (24X)	390535-001	
	b) DVD-ROM drive (8X)*	383981-005	
	c) DVD/CD-RW combo drive*	398760-001	
	d) DVD-RW drive*	399403-001	
12	Non-hot-plug SATA hard drive		Mandatory
	a) 80 GB	399967-001	
	b) 160 GB*	399968-001	
	c) 250 GB*	399969-001	
	d) 500 GB*	404654-001	
13	Hot-plug hard drive		Mandatory
	a) 80 GB SATA hard drive	397551-001	
	b) 160 GB SATA hard drive*	397552-001	
	c) 250 GB SATA hard drive*	397553-001	
	d) 500 GB SATA hard drive*	395501-001	
	e) 750 GB SATA hard drive*	432401-001	
	f) 36 GB SAS hard drive*	376593-001	
	g) 72 GB SAS hard drive*	376594-001	
	h) 146 GB SAS hard drive*	376595-001	
	i) 300 GB SAS hard drive*	432146-001	

Table 2 System components spare parts list

Item	Description	Spare part number	Customer self repair
	Signal cable kits*		
14	IDE data cable assembly	390494-001	Mandatory
15	Non-hot-plug SATA data cable	416351-001	Mandatory
16	Hot-plug cable	385840-001	Mandatory
	Power		
17	650W power supply unit	416349-001	Mandatory
18	3V 200-mAh internal lithium battery for system board	153099-001	Mandatory
	Miscellaneous*		
19	Front USB port cable*	408287-001	Mandatory
20	Front panel board cable*	390493-001	Mandatory
21	Hardware/plastic kit*	416354-001	Mandatory
22	Hardware mounting kit*	360104-001	Mandatory

* not shown

[1]Mandatory—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.

[2]Optional—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

[3]No—Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

[1]Mandatory: Obligatoire—Pièces pour lesquelles la réparation par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.

[2]Optional: Facultatif—Pièces pour lesquelles la réparation par le client est facultative. Ces pièces sont également conçues pour permettre au client d'effectuer lui-même la réparation. Toutefois, si vous demandez à HP de remplacer ces pièces, l'intervention peut ou non vous être facturée, selon le type de garantie applicable à votre produit.

[3]No: Non—Certaines pièces HP ne sont pas conçues pour permettre au client d'effectuer lui-même la réparation. Pour que la garantie puisse s'appliquer, HP exige que le remplacement de la pièce soit effectué par un Mainteneur Agréé. Ces pièces sont identifiées par la mention “Non” dans le Catalogue illustré.

[1]Mandatory: Obbligatorie—Parti che devono essere necessariamente riparate dal cliente. Se il cliente ne affida la riparazione ad HP, deve sostenere le spese di spedizione e di manodopera per il servizio.

[2]Optional: Opzionali—Parti la cui riparazione da parte del cliente è facoltativa. Si tratta comunque di componenti progettati per questo scopo. Se tuttavia il cliente ne richiede la sostituzione ad HP, potrebbe dover sostenere spese addizionali a seconda del tipo di garanzia previsto per il prodotto.

[3]No: Non CSR—Alcuni componenti HP non sono progettati per la riparazione da parte del cliente. Per rispettare la garanzia, HP richiede che queste parti siano sostituite da un centro di assistenza autorizzato. Tali parti sono identificate da un "No" nel Catalogo illustrato dei componenti.

[1]Mandatory: Zwingend—Teile, die im Rahmen des Customer Self Repair Programms ersetzt werden müssen. Wenn Sie diese Teile von HP ersetzen lassen, werden Ihnen die Versand- und Arbeitskosten für diesen Service berechnet.

[2]Optional: Optional—Teile, für die das Customer Self Repair-Verfahren optional ist. Diese Teile sind auch für Customer Self Repair ausgelegt. Wenn Sie jedoch den Austausch dieser Teile von HP vornehmen lassen möchten, können bei diesem Service je nach den für Ihr Produkt vorgesehenen Garantiebedingungen zusätzliche Kosten anfallen.

[3]No: Kein—Einige Teile sind nicht für Customer Self Repair ausgelegt. Um den Garantieanspruch des Kunden zu erfüllen, muss das Teil von einem HP Servicepartner ersetzt werden. Im illustrierten Teilekatalog sind diese Teile mit „No" bzw. „Nein" gekennzeichnet.

[1]Mandatory: Obligatorio—componentes para los que la reparación por parte del usuario es obligatoria. Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.

[2]Optional: Opcional— componentes para los que la reparación por parte del usuario es opcional. Estos componentes también están diseñados para que puedan ser reparados por el usuario. Sin embargo, si precisa que HP realice su sustitución, puede o no conllevar costes adicionales, dependiendo del tipo de servicio de garantía correspondiente al producto.

[3]No: No—Algunos componentes no están diseñados para que puedan ser reparados por el usuario. Para que el usuario haga valer su garantía, HP pone como condición que un proveedor de servicios autorizado realice la sustitución de estos componentes. Dichos componentes se identifican con la palabra "No" en el catálogo ilustrado de componentes.

[1]Mandatory: Verplicht—Onderdelen waarvoor Customer Self Repair verplicht is. Als u HP verzoekt deze onderdelen te vervangen, komen de reiskosten en het arbeidsloon voor uw rekening.

[2]Optional: Optioneel—Onderdelen waarvoor reparatie door de klant optioneel is. Ook deze onderdelen zijn ontworpen voor reparatie door de klant. Als u echter HP verzoekt deze onderdelen voor u te vervangen, kunnen daarvoor extra kosten in rekening worden gebracht, afhankelijk van het type garantieservice voor het product.

[3]No: Nee—Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

[1]Mandatory: Obrigatória—Peças cujo reparo feito pelo cliente é obrigatório. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.

[2]Optional: Opcional—Peças cujo reparo feito pelo cliente é opcional. Essas peças também são projetadas para o reparo feito pelo cliente. No entanto, se desejar que a HP as substitua, pode haver ou não a cobrança de taxa adicional, dependendo do tipo de serviço de garantia destinado ao produto.

[3]No: Nenhuma—Algumas peças da HP não são projetadas para o reparo feito pelo cliente. A fim de cumprir a garantia do cliente, a HP exige que um técnico autorizado substitua a peça. Essas peças estão identificadas com a marca “No” (Não), no catálogo de peças ilustrado.

[1]Mandatory：必須 - 顧客自己修理が必須の部品。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費がお客様に請求されます。

[2]Optional：任意 - 顧客自己修理が任意である部品。この部品も顧客自己修理用です。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、お買い上げの製品に適用される保証サービス内容の範囲内においては、費用を負担していただくことなく保証サービスを受けることができます。

[3]No：除外 - HP製品の一部の部品は、顧客自己修理用ではありません。製品の保証を継続するためには、HPまたはHP正規保守代理店による交換作業が必須となります。部品カタログには、当該部品が顧客自己修理除外品である旨が記載されています。

[1]Mandatory: 强制性的 — 要求客户必须自行维修的部件。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。

[2]Optional: 可选的 — 客户可以选择是否自行维修的部件。这些部件也是为客户自行维修设计的。不过，如果您要求 HP 为您更换这些部件，则根据为您的产品指定的保修服务类型，HP 可能收取或不再收取任何附加费用。

[3]No: 否 — 某些 HP 部件的设计并未考虑客户自行维修。为了满足客户保修的需要，HP 要求授权服务提供商更换相关部件。这些部件在部件图解目录中标记为“否”。

[1]Mandatory: 強制的 — 客戶自行維修所使用的零件是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。

[2]Optional: 選購的 — 客戶自行維修所使用的零件是選購的。這些零件也設計用於客戶自行維修之用。不過，如果您要求 HP 為您更換，則可能需要也可能不需要負擔額外的費用，端視針對此產品指定的保固服務類型而定。

[3]No: 否 — 某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

[1] Mandatory: 필수 — 고객 셀프 수리가 의무 사항인 필수 부품. 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.

[2] Optional: 옵션 — 고객 셀프 수리가 선택 사항인 부품. 이 부품들도 고객 셀프 수리가 가능하도록 설계되었습니다. 하지만 사용자가 HP에 이 부품의 교체를 요청할 경우 사용자가 구입한 제품에 해당하는 보증 서비스 유형에 따라 추가 비용 없이 교체가 가능할 수 있습니다.

[3] No: No — 고객 셀프 수리가 불가능하도록 설계된 HP 부품. 이 부품들은 고객 셀프 수리가 불가능하도록 설계되었습니다. HP는 고객 보증을 만족시키기 위해 공인 서비스 제공업체를 통해 부품을 교체하도록 하고 있습니다.

HP contact information

For the name of the nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- In other locations, refer to the HP website at **www.hp.com**.

For HP technical support:

- In North America:
  - Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
  - If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website at **www.hp.com**.
- Outside North America, call the nearest HP Technical Support Phone Center. For telephone numbers for worldwide Technical Support Centers, refer to the HP website at **www.hp.com**.

Before you contact HP

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

Removal and replacement procedures

Required tools

In performing any hardware configuration procedure you may need the following tools:

- T-15 Torx screwdriver
- Flat-blade screwdriver

The following references and software tools may also be used:

- HP ProLiant DL140 Generation 3 Server Support CD
- IPMI Event Log
- Diagnostics software

NOTE: The figures used in this guide to illustrate procedural steps are labeled numerically (i.e., 1, 2…). When these figures are used in substep items, the alphabetically labeled instructions correspond to the numbered labels on the related figure (i.e., Label 1 corresponds to step a, label 2 corresponds to step b, etc.).

Hardware configuration warnings

Read the following sections before performing any servicing or troubleshooting procedure.

WARNING: Only authorized technicians trained by HP should attempt to repair this equipment. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

CAUTION: Whenever installing hardware or performing maintenance procedures requiring access to internal components, it is recommended that all server data be backed up to avoid loss.

IMPORTANT: Review the specifications of a new component before installing it to make sure it is compatible with the server. When you integrate new components into the system, record its model and serial number, and any other pertinent information for future reference. After completing any removal or replacement procedure, run the diagnostics program to verify that all components operate properly.

Server warnings and cautions

Before installing a server, be sure that you understand the following warnings and cautions.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: The server must always be operated with the system top cover on. Proper cooling is not achieved when the system covers are removed.

CAUTION: Whenever installing hardware or performing maintenance procedures requiring access to internal components, it is recommended that all server data be backed up to avoid loss.

IMPORTANT: Before removing any serviceable parts, determine whether the part is hot-plug or non-hot-plug. If the device is non-hot-plug, you must power down the server. Non-hot-plug devices in the server include the processor, all boards, memory modules, fans, expansion boards, and all system drives.

IMPORTANT: Review the specifications of a new component before installing it to make sure it is compatible with the server. When you integrate new components into the system, record its model and serial number, and any other pertinent information for future reference. After completing any removal or replacement procedure, run the diagnostics program to verify that all components operate properly.

Symbols on equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.

This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

weight1_kg
weight1_lb

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

Rack warnings

WARNING: To reduce the risk of personal injury or damage to equipment, always ensure that the rack is adequately stabilized before extending a component outside the rack. A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizers are attached to the rack, if it is a single rack installation.
- The racks are coupled together in multiple rack installations.

WARNING: When installing the server in a Telco rack, make certain that the rack frame is adequately secured to the building structure at the top and bottom.

WARNING: To reduce the risk of personal injury or damage to the equipment, at least two people are needed to safely unload the rack from the pallet. An empty 42U rack weighs 115 kg (253 lb), is over 2.1 m (7 ft) tall, and may become unstable when being moved on its casters. Do not stand in front of the rack as it rolls down the ramp from the pallet. Handle the rack from both sides.

CAUTION: This ProLiant server is intended for rack-mount operation. The server bezel is made from glossy material. For safety purposes, do not place the server in the visual field of users to prevent any accidents arising from light bouncing off the bezel's surface.

ACHTUNG: Entsprechend der Bildschirmabeitsplatzverordnung, darf das Gerät nicht im Gesichtsfeld des Bedieners aufgestellt werden, da das Gehäuse eine glänzende Front aufweist.

Electrostatic discharge information

An electrostatic discharge (ESD) can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Use a wrist strap connected to the work surface, and properly grounded (earthed) tools and equipment.
- Keep work area free of nonconductive materials, such as ordinary plastic assembly aids and foam packing.
- Make sure that you are always properly grounded (earthed) when touching a static-sensitive component or assembly.

- Avoid touching pins, leads, or circuitry.
- Always place drives with the Printed Circuit Board (PCB) assembly-side down.
- Use conductive field service tools.

Pre-installation procedure

Perform the steps below before you open the server or before you remove or replace any component.

1. Perform data backup.
2. Turn off the server and all the peripherals connected to it.
3. Unplug all cables from the power outlets to avoid exposure to high energy levels that may cause burns when parts are short circuited by metal objects such as tools or jewelry.

   If necessary, label each one to expedite reassembly.
4. Disconnect telecommunication cables to avoid exposure to shock hazard from ringing voltages.
5. Open the server according to the instructions described in the "System covers" section later in this chapter.
6. Follow the ESD precautions listed previously in this chapter when handling any hardware component.

IMPORTANT: To streamline the configuration process, read through the entire installation/removal procedure first and make sure you understand it before you before you begin.

Post-installation procedure

Perform the steps below after installing or removing a server component.

1. Be sure all components are installed according to the described step-by-step instructions.
2. Check to make sure you have not left loose tools or parts inside the server.
3. Reinstall any expansion board(s), peripheral(s), board cover(s), bracket (s) and system cable(s) that have previously been removed.

CAUTION: Do not operate the server for more than ten minutes with the access panel and disk drives removed. Otherwise, improper cooling airflow may damage the system components.

4. If you have removed the air duct and/or the PCI riser board bracket, reinstall it.
5. Reinstall the top cover.
6. Connect all external cables and the AC power cord to the system.
7. Press the power button ⏻ on the front panel to turn on the server.

Powering down the server

The server does not completely power down when the power button ⏻ is pressed. The button toggles between On and Standby. The standby position removes power from most electronics and the drives, but some internal circuitry remains active. To completely remove all power from the system, disconnect all power cords from the server.

⚠ **WARNING:** Hazardous voltages are present inside the server. Always disconnect AC power from the server and other associated assemblies while working inside the unit. Serious injury may result if this warning is not observed.

⚠ **WARNING:** To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from the power supply to disconnect power to the equipment.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.

⚠ **CAUTION:** Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes, and keeps the system in operation during a power failure.

1. Shut down server as directed by the operating system documentation.
2. Press the power button ⏻ to toggle to Standby.

   This places the server in standby mode changing the power LED indicator to amber. In this mode, the main power supply output is disabled. Standby does not completely disable or remove power from the system.
3. Disconnect the AC power cord from the AC outlet and then from the server.
4. Check that the power LED indicator is turned off and that the fan noise has stopped.
5. Disconnect all external peripheral devices from the server.

Cable management

Always follow good cable management practices when working inside the computer.

- Keep cables away from major heat sources like the heat sink fan assembly.
- Do not jam cables on top of expansion cards or memory modules. Printed circuit cards are not designed to withstand excessive pressure.
- Keep cables clear of sliding or moveable parts to prevent cutting or crimping.
- When folding a flat ribbon cable, never fold to a sharp crease. Sharp creases may damage the wires.
- Some flat ribbon cables come prefolded. Never change the folds on these cables.
- Do not sharply bend any cable. A sharp bend can break the internal wires.
- Never bend a SATA data cable tighter than a 30 mm (1.18 in) radius.
- Never crease a SATA data cable.

- Do not rely on components like the drive cage, power supply, or system cover to push cables down into the chassis.

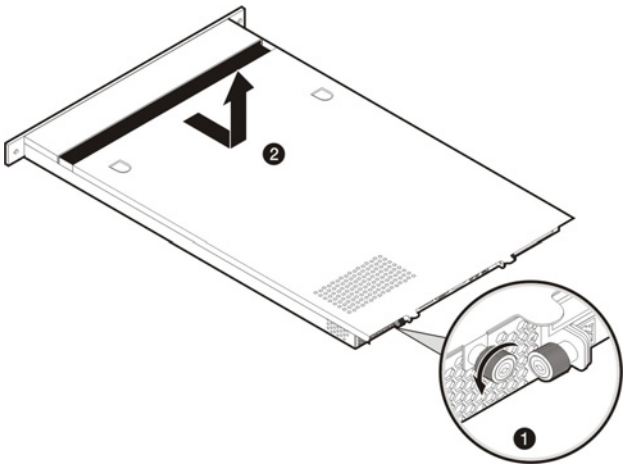
Opening the server

The top cover is detachable. Remove this cover before you can remove or replace a server component.

To remove the top cover:

1. Perform steps 1 through 3 of the pre-installation procedure.
2. Detach the top cover from the chassis.
   a. Loosen the captive thumbscrew on the rear panel.
   b. Slide the cover approximately 1.25 cm (0.5 in) toward the rear of the unit, and then lift the cover to detach it from the chassis.

Figure 1 Removing the top cover

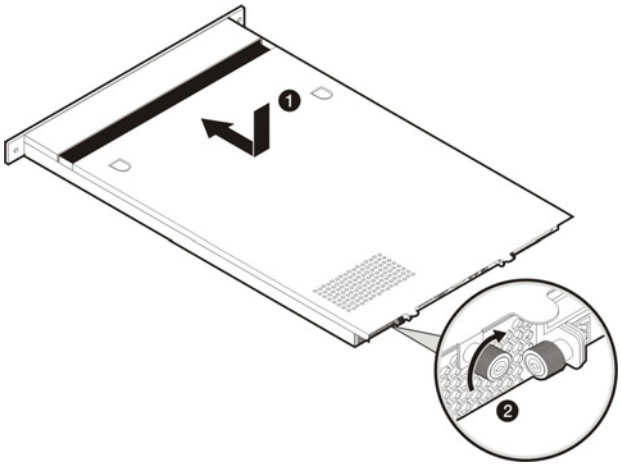


3. Place the top cover in a safe place for reinstallation later.

To reinstall the top cover:

1. Perform steps 1 through 4 of the post-installation procedure.
2. Reinstall the top cover.
   a. Align the cover to the chassis and then slide it towards the front panel to position it into place.
   b. Once the cover is attached to the chassis, secure it by tightening the captive thumbscrew on the rear panel.

Figure 2 Reinstalling the top cover



3. Perform steps 6 and 7 of the post-installation procedure.

Drive bay configuration

The server supports three drive bays—two drive bays for 1-inch hard disk drives and one drive bay for a slim-type optical media drive.

Go to the HP website at **www.hp.com** and refer to the options list for this server model for the latest information on supported hard drives and optical media drives.

Figure 3 System drive bays

Item	Description
1	1-inch hard disk drive bays (two)
2	Optical media device bay

NOTE: The HDD bays support both non-hot-plug and hot-plug SATA drives, as well as hot-plug SAS drives.

System drive cable connections

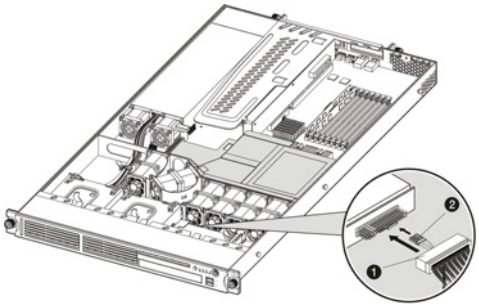
This section highlights the location of the system board connectors for the system drives' data cables.

IMPORTANT: Observe the cable management guidelines listed on page 30 when routing the drive cables.

NOTE: The data cable of a SAS hard drive should be connected to the installed SAS controller board.

Optical media drive cables

Figure 4 Optical media drive cable connections

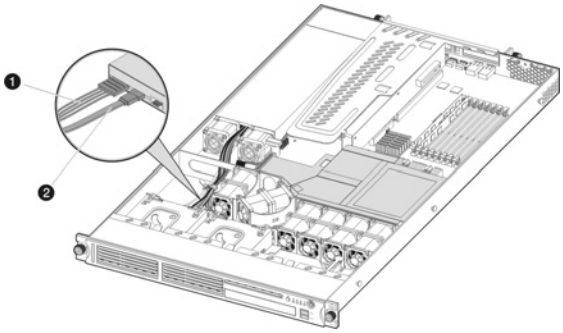


Item	Description
1	IDE data cable
2	Optical media drive power cable

Hard drive cables

Non-hot-plug SATA hard drive cables

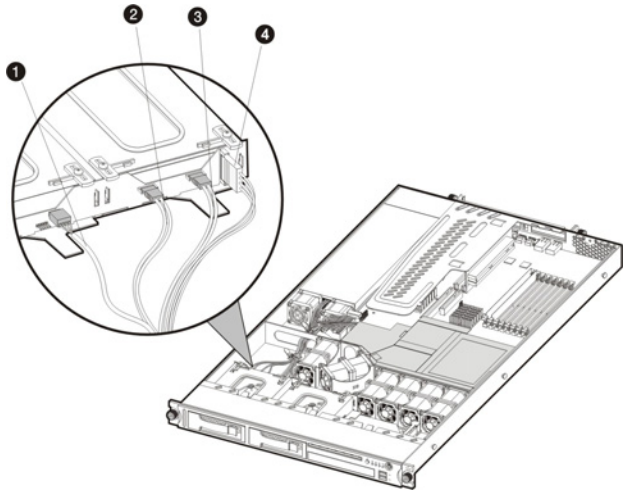
Figure 5 Non-hot-plug SATA HDD cable connections



Item	Description
1	Non-hot-plug SATA drive power cable
2	Non-hot-plug SATA data cable

Hot-plug SATA/SAS hard drive cables

Figure 6 Hot-plug SATA/SAS HDD cable connections



Item	Description
1	9-pin HDD LED cable connector
2	HDD 2 data cable connector
3	HDD 1 data cable connector
4	15-pin HDD power cable connector

Optical media drive

The optical media device bay supports the installation of a slim-type CD-ROM or DVD-ROM drive.

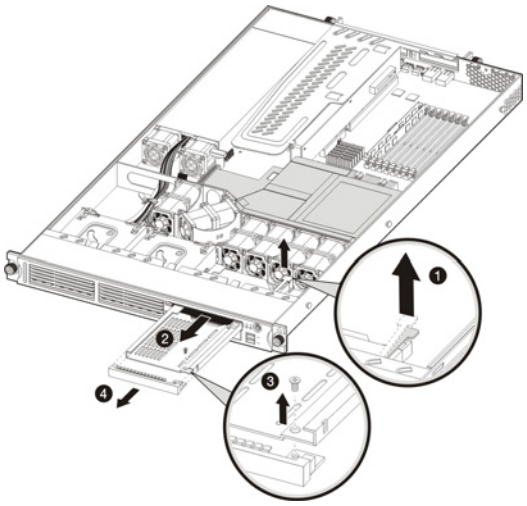
To install a CD or DVD drive:

1. Perform the pre-installation procedure.
2. Prepare the optical media device bay for installation.
   a. Pull up the optical media device bay release lever, and then push the drive carrier partially out through the front of the chassis.
   b. Pull the drive carrier out of the chassis.
   c. Remove the screw securing the drive carrier bezel.
   d. Detach the drive carrier bezel.

      Store the drive carrier bezel (with its screw) for reassembly later.

CAUTION: Do not discard the drive carrier bezel. If the optical drive is removed in the future, this bezel must be reinstalled in the chassis for proper cooling of the system.

Figure 7 Preparing the optical media device bay for installation

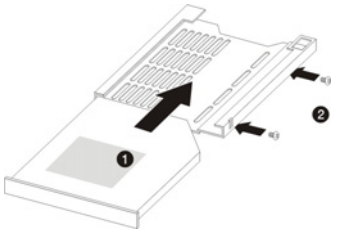


3. Remove the new optical drive from its protective packaging.

   The optical drive option kits include mounting screws for drive installation.

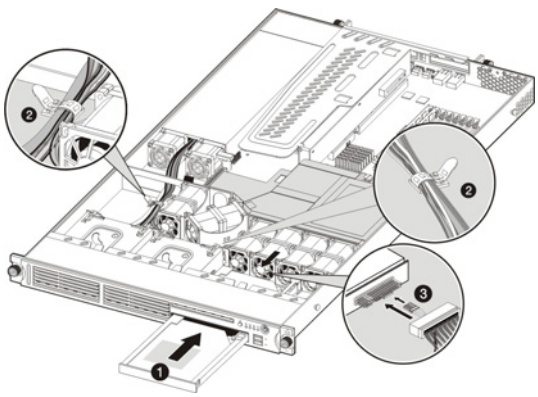
4. Install the new optical drive in its carrier.
   a. Align the optical drive in the carrier.
   b. Secure the drive with two mounting screws.

Figure 8 Installing the optical media drive in its carrier



5. Install the new optical drive into the chassis.
   a. Slide the optical drive assembly into the chassis until the media device bay release lever snaps into place.
   b. Make sure the optical drive cables are routed neatly. Secure them using the pre-installed cable clips located on the chassis base.
   c. Connect the IDE data and power cables to their corresponding connectors on the optical drive's backplane board.

Figure 9 Installing the optical drive assembly in the chassis

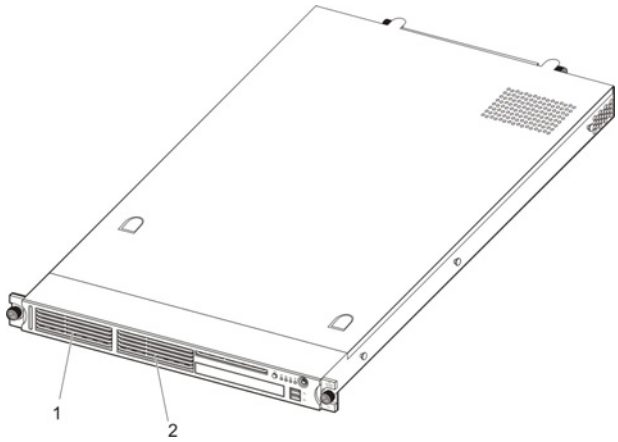


6. Perform the post-installation procedure.

Hard drives

Hard drives installed in the server are labeled as Device 1 and Device 2, from left to right, when viewed from the front of the server.

Figure 10 Hard drive device numbers



Hard drive support

The server's HDD bays support both non-hot-plug and hot-plug SATA drives, as well as hot-plug SAS drives. The low-end system comes with a single hard drive. The type and capacity of drives vary based on the server model. Your ProLiant server currently supports the following drive capacities:

- Non-hot-plug SATA drives – 80-, 160-, 250, and 500-GB
- Hot-plug SATA drives – 80-, 160-, 250, 500, and 750-GB
- Hot-plug SAS drives – 36-, 72-, 146-, and 300-GB

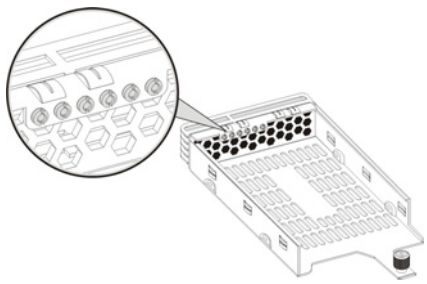
The non-hot-plug SATA drive options do not include a carrier. Use the HDD carriers and mounting screws included with your server to install these drives.

The hot-plug SATA and SAS drive options come with their own hot-plug HDD carrier. Users can directly install these drives into the server.

Guidelines for installing hard drives

- Install only hard drive models specified for your ProLiant server. Installing unsupported hard drives may damage the system by consuming power and generating heat in excess of the server's operating tolerance. This condition may result in a loss of system and/or data integrity.
- Install non-hot-plug drives in the drive carriers included with the server chassis using four of the six HDD screws pre-installed in each of the two HDD carriers.

Figure 11 HDD mounting screws



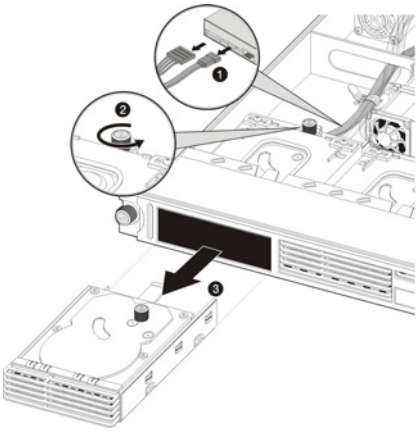
- The hot-plug hard drive options come with its own HDD carrier. This carrier has two LED indicators (drive activity and fault identification) to show the hot-plug drive's current status.
- If you removed a hard drive without plans of installing a new one, you must reinstall the mounting screws to the blank HDD carrier, and then reinstall the carrier in the chassis for proper cooling of the system.

Removing a hard drive

To remove a non-hot-plug SATA hard drive:

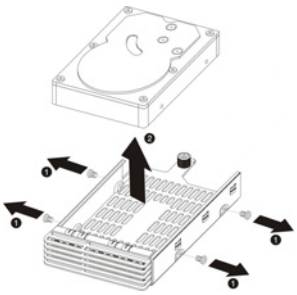
1. Perform the pre-installation procedure.
2. Remove the non-hot-plug SATA hard drive from the chassis.
   a. Disconnect the data and power cables from the rear of the hard drive.
   b. Loosen the screw that secures the HDD carrier to the chassis.
   c. Push the HDD carrier towards the front of the chassis, and then slide it out completely.

Figure 12 Removing the hard drive from the chassis



3. Remove the non-hot-plug SATA hard drive from its carrier.
   a. Remove the four mounting screws that secure the hard drive to the carrier.
   b. Remove the hard drive from its carrier.

Figure 13 Removing the non-hot-plug SATA hard drive from its carrier

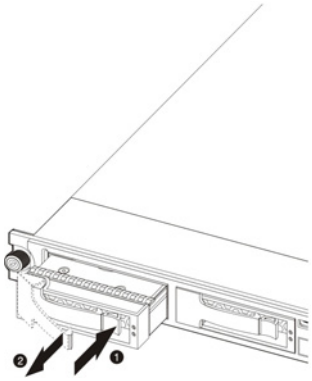


To remove a hot-plug SATA/SAS hard drive:

1. Make sure that the drive activity and fault identification LED indicators on the HDD carrier are off.
2. Remove the hot-plug SATA/SAS hard drive from the chassis.
   a. Press the hard disk carrier button to release the ejector lever.
   b. Use the ejector lever to pull the drive out of the cage.

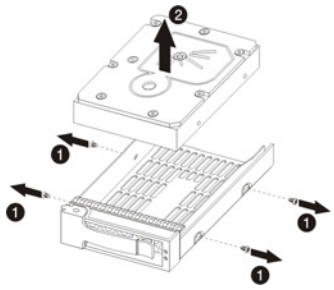
      Make sure to support the drive when pulling it out of the cage.

Figure 14 Removing the hot-plug SATA/SAS hard drive from the chassis



3. Remove the hot-plug SATA/SAS hard drive from its carrier.
   a. Remove the four mounting screws that secure the hard drive to the carrier.
   b. Remove the hard drive from its carrier.

Figure 15 Removing the hot-plug SATA/SAS hard drive from its carrier



Configuring a non-hot-plug SATA hard drive

To install a non-hot-plug SATA hard drive:

NOTE: If you are switching from a hot-plug SAS hard drive system to a non-hot-plug SATA one, you first need to remove the hot-plug backplane board, the hot-plug SATA/SAS controller board, and the hot-plug cable. After that install the non-hot-plug SATA cable.

1. Perform the pre-installation procedure.
2. Select which drive bay you will use to install the new non-hot-plug SATA hard drive.

   If the desired drive bay is occupied, remove the currently installed drive following the procedure described on page 37.

   If the desired drive bay is empty, slide the blank HDD carrier from the bay, and then remove four mounting screws from it. You will use these screws to install the new drive.

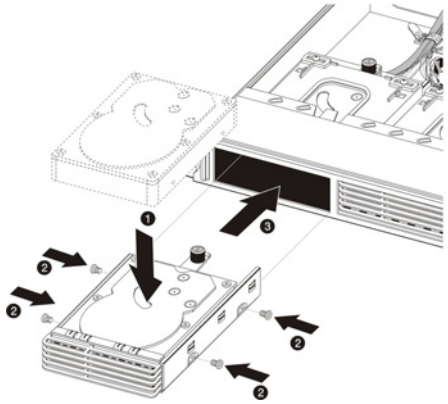
3. Install the new non-hot-plug SATA hard drive in its carrier.

   If you are installing the new drive in a previously occupied drive bay, use the HDD carrier and mounting screws you removed from the old drive.

   If you are installing the new drive in an empty drive bay, use the HDD carrier and mounting screws you removed from that drive bay.

   a. Align the new hard drive on the carrier.
   b. Secure the hard drive assembly with the four mounting screws.
   c. Slide the hard drive assembly into the chassis.

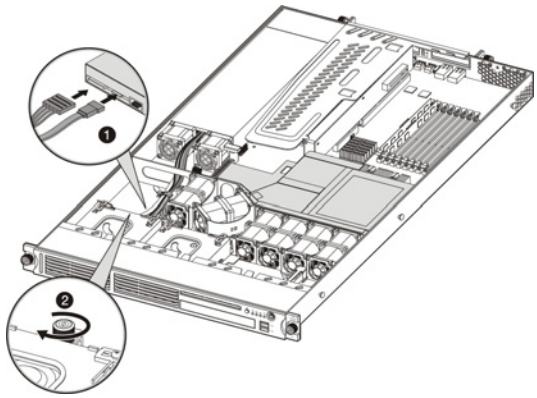
Figure 16 Installing a non-hot-plug SATA hard drive



4. Connect the non-hot-plug SATA drive cables.

   a. Connect the SATA data and power cables to their corresponding connectors on the rear of the new drive.
   b. Check that all cables are clear of the hard drive carrier, and then tighten the screw that secures the hard drive assembly to the chassis.

Figure 17 Connecting the non-hot-plug SATA hard drive cables



5. Perform the post-installation procedure.
6. Set up the SATA configuration.

   For detailed procedures, refer to the Server Support CD or to the operating system documentation.

Configuring a hot-plug SATA/SAS hard drive

NOTE: The procedures below assume that the user is switching from a non-hot-plug SATA hard drive system to a hot-plug SATA/SAS one.

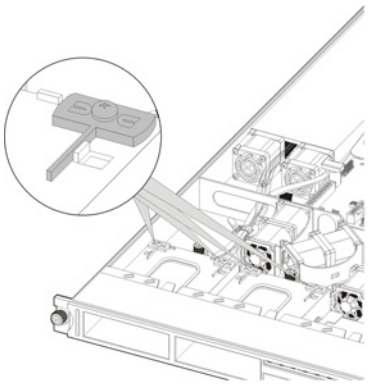
The steps listed below give an overview of the hot-plug SATA/ SAS hard drive configuration procedure.

1. Install the hot-plug backplane board.
2. Install the PCI-X riser board.
3. Install the hot-plug SATA/SAS controller board.
4. Install the hot-plug cable.
5. Install the hot-plug SATA/SAS hard drive.
6. Set up the SATA/SAS configuration.

To install the hot-plug backplane board:

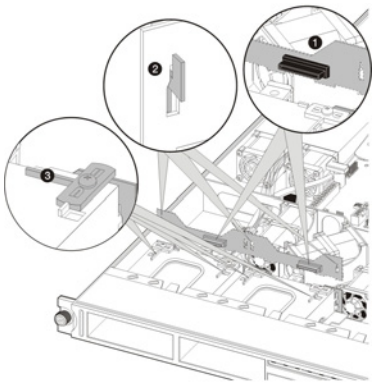
1. Perform the pre-installation procedure.
2. Remove the non-hot-plug HDD carriers and the non-hot-plug SATA data cables from the unit.
3. Rotate the blue T-locks on top of the HDD cage to the unlock position.

Figure 18 Unlocking the HPBB T-locks



4. Install the hot-plug backplane board (HPBB).
   a. Position the board, so that the connectors for the drive engagement are inside the drive cage, and that
   b. The hooks on the rear of the drive cage engage with the slots in the board and that the bottom of the board fits the bent tabs on the chassis base.
   c. Rotate the T-locks to the lock position to prevent the board from moving up.

Figure 19 Installing the hot-plug backplane board



5. Install the PCI-X riser board.

   Refer to page 55 for detailed procedure.

6. Install the hot-plug SATA/SAS controller board.

   Refer to page 56 for detailed procedure.

7. Install the hot-plug cable.

   Proceed to the next section for instructions.

To install the hot-plug cable:

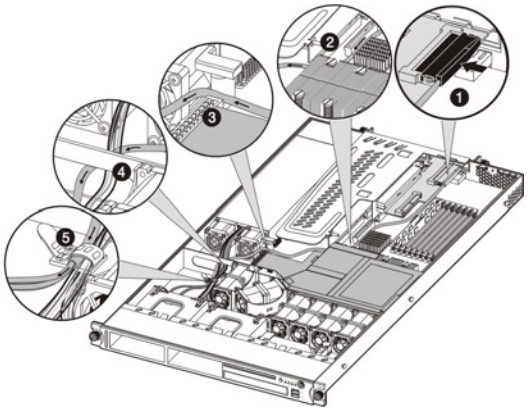
Procedure for the hot-plug cable installation varies depending on which expansion slot you used to install the hot-plug SATA/SAS controller board—the low-profile slot or the standard height/full-length slot.

1. If you installed the hot-plug SATA/SAS controller board in the low-profile slot, reinstall the PCI riser board assembly, and then proceed to the next step.

   If you installed the hot-plug SATA/SAS controller board in the standard height slot, proceed to step 4.

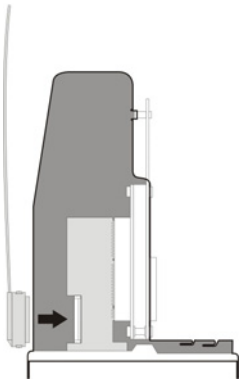
2. Route the hot-plug cable from the low-profile slot to the backplane board.
   a. Engage the connector end of the cable to the rear connector of the hot-plug SATA/SAS controller board.
   b. Lay the cable between the PCI Express x16 slot and the Intel MCH chipset.
   c. Route the cable between the ATX system board power connector and the PCI retainer bracket.
   d. Position the cable underneath the PSU cables, and then pull it through towards the chassis' partition wall.
   e. Secure the cable using the pre-installed cable clips located on the chassis base.

Figure 20 Routing the hot-plug cable from the low-profile slot



3. Proceed to step 7 for instructions on how to connect the hot-plug cable to the backplane board.
4. Route the hot-plug cable from the standard height slot to the backplane board by first engaging the connector end of the cable to the rear connector of the hot-plug SATA/SAS controller board.

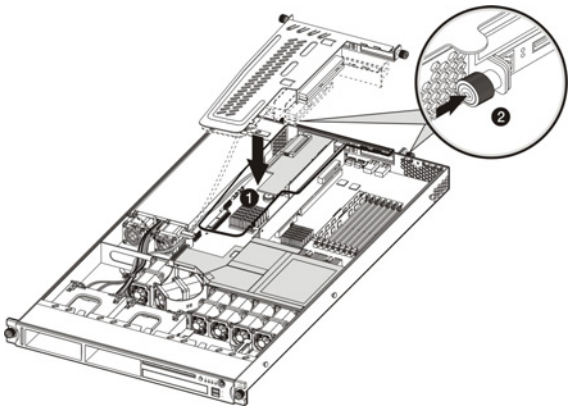
Figure 21 Connecting the hot-plug cable to a controller board installed in the standard height slot



5. Reinstall the PCI riser board assembly.
   a. Align the assembly with the system board expansion slots, and then press it down to ensure full connection to the system board.

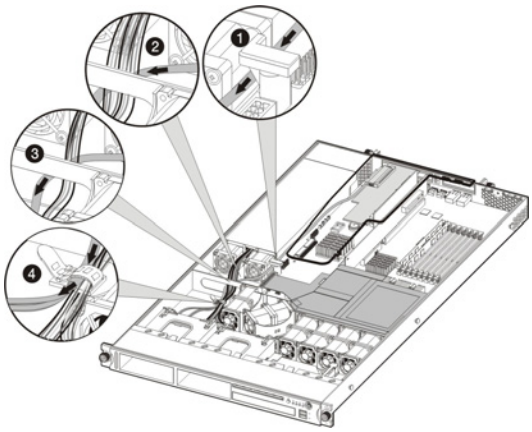
      Make sure the hot-plug cable lays flat in the space between the system board and the power supply unit.
   b. Tighten the two captive thumbscrews to secure the assembly to the chassis.

Figure 22 Reinstalling the PCI riser board assembly



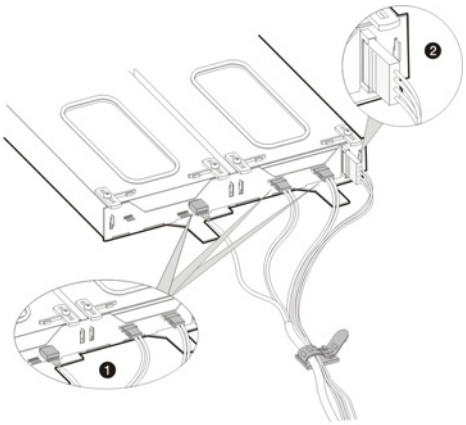
6. Route the hot-plug cable towards the backplane board.
   a. Lay the hot-plug cable in the space between the PCI retainer bracket and the power supply unit.
   b. Position the hot-plug cable underneath the PSU cables, and then pull it through towards the chassis' partition wall.
   c. Pull the hot-plug cable through the cable management opening of the chassis' partition wall.
   d. Secure the hot-plug cable using the pre-installed cable clips located on the chassis base.

Figure 23 Routing the hot-plug cable from the standard height slot



7. Connect the hot-plug and PSU HDD cables to the backplane board.
   a. Connect the HDD LED and data cable connectors of the hot-plug cable to the backplane board.
   b. Connect the PSU HDD power cable to the CN7 connector on the backplane board.

Figure 24 Connecting the backplane board cables



8. Perform the post-installation procedure.
9. Install the new hot-plug SATA/SAS hard drive to the unit.

   Proceed to the next section for instructions.

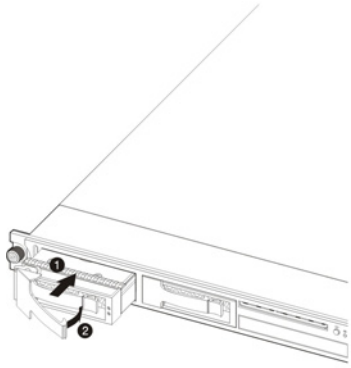
To install a hot-plug SATA/SAS hard drive:

1. Select which drive bay you will use to install the new hot-plug SATA/SAS hard drive.

   If the desired drive bay is occupied, remove the currently installed drive following the procedure described in page 38.

   If the desired drive bay is empty, slide the blank HDD carrier from the bay.
2. Install the new hot-plug SATA/SAS hard drive.
   a. Slide the new drive into the selected drive bay.
   b. Close the ejector lever to secure the new drive in the chassis.

Figure 25 Installing a hot-plug SATA/SAS hard drive



3. Set up the SATA/SAS configuration.

   Refer to the documentation that came with the hot-plug SATA/SAS controller board for detailed procedure.

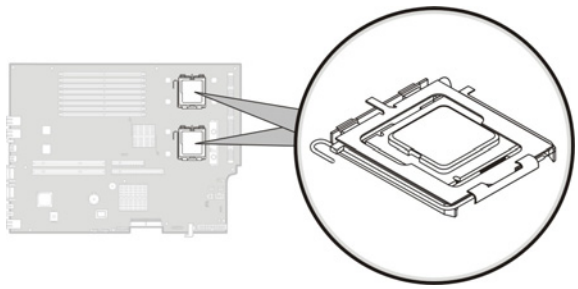
System board configuration

Refer to the following sections for instructions about how to remove or replace the processor, memory modules, expansion boards, the IPMI card, and the system battery.

Processor

The server's two LGA771 processor sockets support Dual-Core and Quad-Core Intel Xeon processors.

Figure 26 Processor socket location

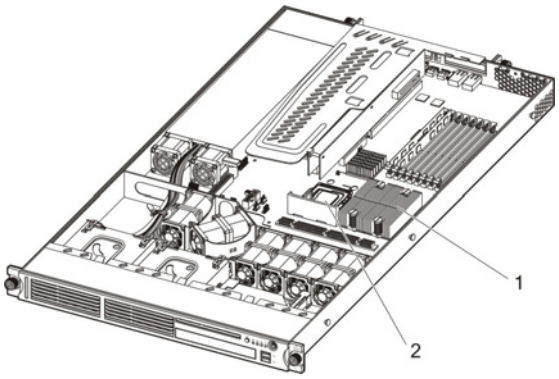


Processor installation guidelines

When configuring the processor, observe the following important guidelines:

- Processor socket 1 (CPU1) must always be populated. If no processor is installed in this socket, the system will fail to boot and will halt during POST (Power-On Self-Test). This error prevents the system from functioning properly.

Figure 27 Processor socket numbers



- Handle the processor and heat sink with care. Damage to either may prevent the system from functioning properly.
- The pins beneath the processor are very fragile. Do not bend or damage them.
- Always use a new heat sink when replacing the processor. Failure to use new components can cause damage to the processor.
- Be sure that the server has the most recent ROM version. Failure to flash the ROM before installing processors can cause system failure.
- To prevent the heat sink from tilting to one side during installation/removal procedures, observe a diagonally opposite pattern (an "X" pattern) when loosening and tightening the four spring loaded screws.

Processor air baffle

The default system comes with a single processor installed in the CPU1 socket. An air baffle protects the empty CPU2 socket. If you intend to install a new processor in this socket—creating a dual-processor configuration—remove the processor air baffle first.

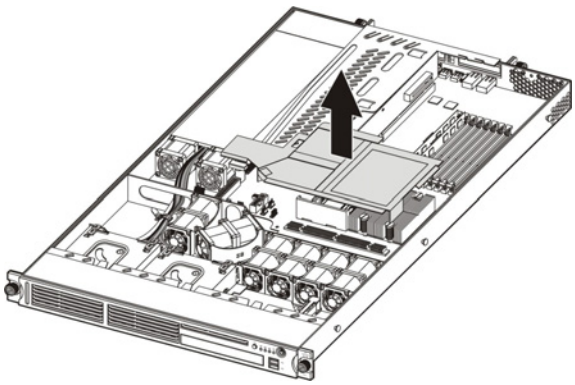
CAUTION: Do not discard the processor air baffle. If the processor in the CPU2 socket is removed in the future, the air baffle must be reinstalled to maintain proper cooling.

To remove the processor air baffle:

1. Perform the pre-installation procedure.
2. Lift the air duct away from the processor sockets.

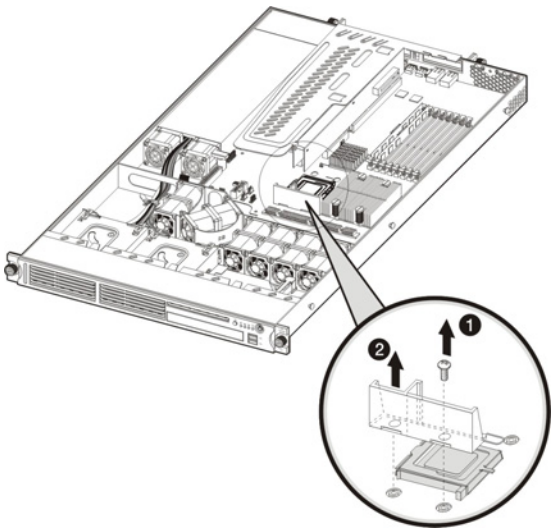
   Keep it for reinstallation later.

Figure 28 Removing the air duct



3. Remove the processor air baffle.
   a. Remove the screw securing the processor air baffle to the system board.
   b. Lift the processor air baffle away from the system board.

Figure 29 Removing the processor air baffle



   c. Store the processor air baffle (with its screw) for reassembly later.

Replacing a processor

WARNING: To reduce the risk of personal injury from hot surfaces, allow the heat sink and the processor to cool before touching them.

CAUTION: To prevent the heat sink from tilting to one side during installation/removal procedures, observe a diagonally opposite pattern (an "X" pattern) when loosening and tightening the four spring loaded screws.

The procedure for replacing a current processor consists of five major steps which are as follows:

1. Remove the heat sink.
2. Remove the current processor.
3. Apply thermal grease.
4. Install the new processor.
5. Install the new HSF assembly.

If you intend to install a new processor in an empty socket, perform steps 3 through 5 only.

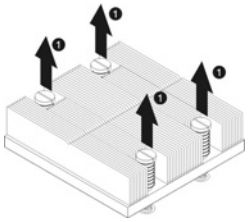
If you intend to install a new processor in previously empty CPU2 socket, remove the air baffle first, and then perform steps 3 through 5 only.

To remove the heat sink:

1. Perform the pre-installation procedure.
2. If necessary, remove any accessory boards or cables that prevent access to the air duct.
3. Lift the air duct away from the processor sockets.

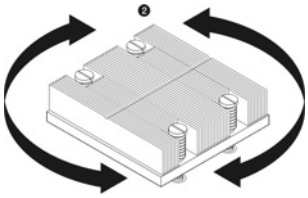
   Keep it for reinstallation later.
4. Locate the processor you want to remove.
5. Remove the heat sink.
   a. Loosen the four spring-loaded screws a few threads out, observing a diagonally opposite pattern, and then loosen them completely to release the heat sink from the processor base.

Figure 30 Loosening the heat sink screws



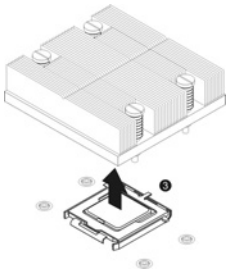
   b. Rotate the heat sink a few degrees clockwise and counterclockwise to break the thermal grease bond loose.

Figure 31 Breaking the thermal grease bond



   c. Lift the heat sink away from the system board.

Figure 32 Removing the heat sink

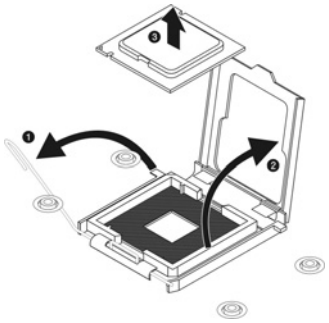


6. Lay the heat sink down in an upright position with the thermal compound side facing upward. Do not let the thermal compound touch the work surface.

To remove a processor:

1. Disengage the load lever.
2. Lift up the retention plate to expose the socket body.
3. Grasp the processor by its edges and carefully lift it out of its socket.

Figure 33 Removing the processor



4. Place the processor on a static-dissipating work surface or inside an anti-static bag.

To apply thermal grease:

CAUTION: Never touch the bottom of the processor; any contaminant on this side of the processor could prevent the mounting pads from making contact with the socket.

CAUTION: Applying too little thermal grease will cause a gap between the contact surfaces. This means that the heat sink is not even in direct contact with the processor, and therefore its capacity to draw out heat is greatly reduced. Furthermore, applying too much thermal grease could make it squish out from the sides and go all over the processor pins or to the system board when the heat sink is installed. The thermal grease may cause electrical shorts that can damage the system.

1. Use the alcohol pad (included in the new processor spare kit) to clean the contact surfaces on the heat sink and the new processor. Wipe the contact surfaces several times to make sure that no particles or dust contaminants are evident. Allow the alcohol to evaporate before continuing.
2. Apply 0.5 gram (0.25 ml) of the thermal grease evenly onto the top of the processor.

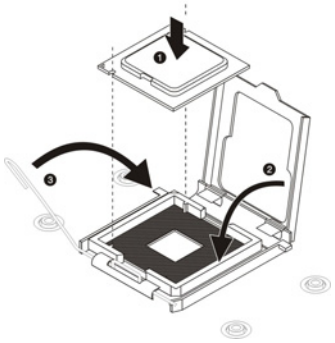
To install the new processor:

1. Hold the processor by its edges, and then insert it in the socket.

   Make sure that the alignment tabs on the socket fit the two notches located on the edge of the processor. The pins are keyed in such a way that you cannot install the processor in the wrong orientation without bending the pins.
2. Close the retention plate.

3. Engage the load lever back into place.

Figure 34 Installing the processor



To install the new heat sink:

CAUTION: To prevent overheating or a possible system crash, use only a heat sink specified for the HP ProLiant ML110 Generation 5 Server.

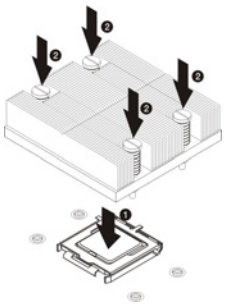
1. Remove and discard the plastic cover protecting the thermal interface material.

   Be careful not to touch or scratch the thermal interface material.
2. Install the new heat sink.
   a. Align then insert the heat sink on top of the processor.

CAUTION: Do not over tighten the heat sink's spring loaded screws to prevent them from breaking off. A maximum torque of 6 in lb is set for the system.

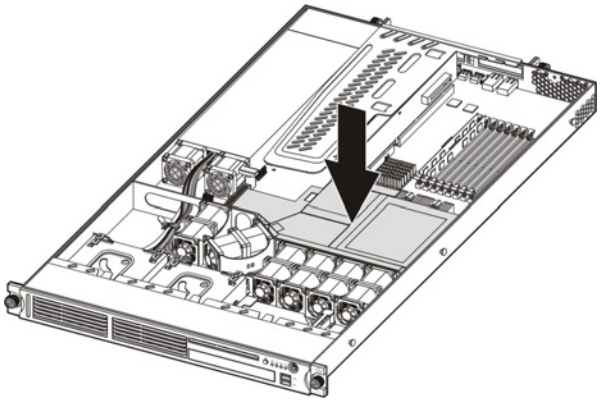
   b. Tighten the four spring-loaded screws a few threads in, observing a diagonally opposite pattern, and then tighten them completely to secure the heat sink to the processor base.

Figure 35 Installing a heat sink



3. Reinstall the air duct in its place.

Figure 36 Reinstalling the air duct

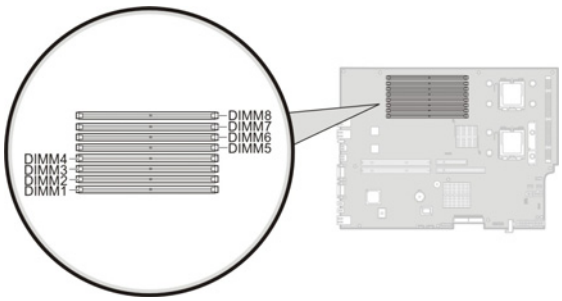


4. Perform the post-installation procedure.

Memory

The system has eight DIMM slots that support up to 16 GB maximum system memory (2 GB in each of the eight DIMM slots).

Figure 37 DIMM slots location



The eight DIMM slots are divided into two branches of two channels each. That is:

- Branch 0
  - Channel 0 – DIMM1 and DIMM 2
  - Channel 1 – DIMM3 and DIMM 4
- Branch 1
  - Channel 0 – DIMM5 and DIMM 6
  - Channel 1 – DIMM7 and DIMM 8

Memory installation guidelines

- Use only HP supported fully buffered registered ECC DDR2 667 DRAM modules in 512 MB, 1 GB, 2 GB, or 4 GB capacities.
- Install identical modules (of the same type, manufacturer, speed, timing, and organization) per the instructions below.
  - When operating in mirror mode:
    - Install the first four modules in the DIMM1, DIMM3, DIMM5, and DIMM7 slots.
    - Memory upgrade granularity (i.e. the number of physical modules required for memory upgrade) is four DIMMs.

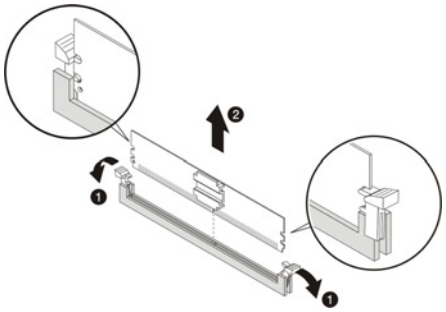
- When operating in non-mirror mode:
  - Install the first pair in the DIMM1 and DIMM3 slots.
  - Memory upgrade granularity is two DIMMs. Observe the following channel pair sequence during installation: DIMM5 - DIMM7, DIMM2 - DIMM4, then DIMM6 - DIMM8.
- When operating in single DIMM mode, the module should be installed in the DIMM1 slot.

CAUTION: DIMMs can be damaged by improper handling. Always use an anti-static wrist strap and grounding mat, and discharge static electricity before touching DIMMs.

To remove a memory module:

1. Perform the pre-installation procedure.
2. If necessary, remove any accessory boards or cables that prevent access to the DIMM slots.
3. Locate the memory module you want to remove.
4. Remove the selected memory module.
   a. Completely open the holding clips securing the module.
      This forces the module up in the slot and makes it easier to remove.
   b. Grasp the middle part of the module, and gently pull it upward to remove it from the slot.

Figure 38 Removing a memory module



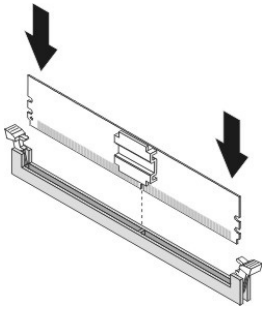
5. Place the memory module on a static-dissipating work surface or inside an anti-static bag.
6. Perform the post-installation procedure.

To install a memory module:

1. Perform steps 1 and 2 of the previous section.
2. Locate an empty DIMM slot on the system board.
3. If necessary, open the holding clips of the selected DIMM slot.
4. Remove the memory module from its protective packaging, handling it by the edges.
5. Use both hands to hold the module by the edges, and then insert it perpendicularly into the slot until it locks into place.

   The DIMM slots are structured to ensure proper installation. If you insert a memory module but it does not fit easily into the slot, you may have inserted it incorrectly. Reverse the orientation of the module and insert it again.

Figure 39 Installing a memory module



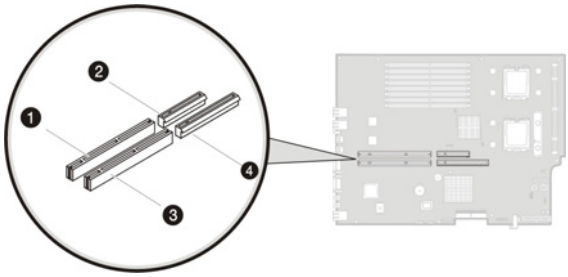
6. Perform the post-installation procedure.

Expansion board

System board PCI expansion slots

There are four PCI expansion slots on the system board.

Figure 40 System board PCI expansion slots



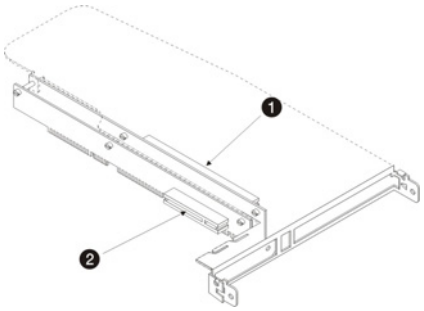
Item	Component code	Description	Function
1	CN4	64-bit/133 MHz * 3.3 V PCI-X slot	Supports a low-profile PCI-X riser board
2	CN5	PCI Express x8 slot	Supports a low-profile PCI Express x8 riser board
3	CN6	64-bit/133 MHz * 3.3 V PCI-X slot	Supports a standard height/full length PCI-X riser board
5	U32	PCI Express x16 slot	Supports a standard height/full length PCI Express x16 riser board

NOTE: The 133 MHz speed is only attainable when one PCI-X riser board card is used. If both PCI Express riser boards are replaced with a PCI-X model, the maximum attainable speed is 100 MHz.

PCI riser board expansion slots

The two PCI Express riser boards attached to the PCI riser board assembly convert the functionality of the system board expansion slots to a pair of slots positioned at a 90° angle from the system board.

Figure 41 System default PCI Express riser boards



Item	Description
1	Standard height/full length PCI Express x16 riser board
2	Low-profile PCI Express x8 riser board

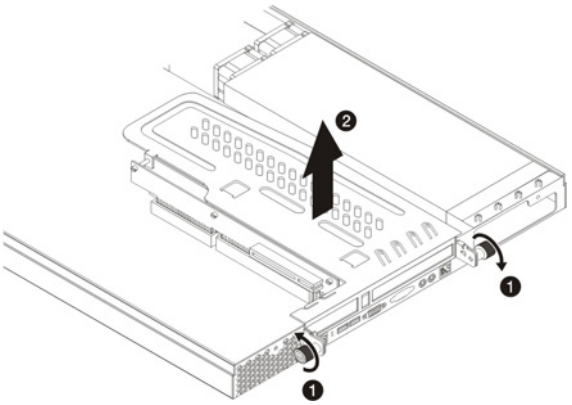
NOTE: Users have the option to replace either or both of the PCI Express riser boards with a PCI-X model using the PCI-X riser board option kit. This will allow support for PCI-X expansion boards.

PCI riser board assembly

To remove the PCI riser board assembly:

1. Perform the pre-installation procedure.
2. Disconnect all cables connecting an existing expansion board to the system board.
3. Remove the PCI riser board assembly.
   a. Loosen the two captive thumbscrews that secure the assembly to the chassis.
   b. Lift the assembly away from the chassis.

Figure 42 Removing the PCI riser board assembly



To install the PCI-X riser board:

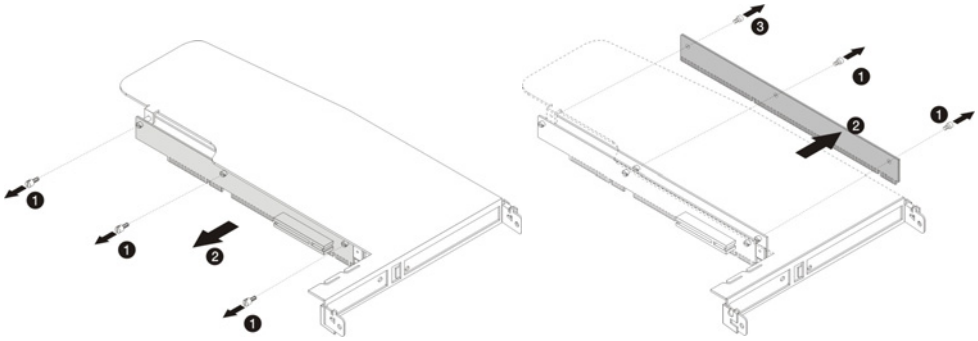
Installing the PCI-X riser board option allows users to install PCI-X compatible expansion boards in the ProLiant server.

NOTE: For ease of reading, the PCI riser board assembly will simply be referred to as "assembly" in the succeeding sections. Furthermore, in some figures, the plane section of the PCI riser board assembly is dimmed out for clarity.

---

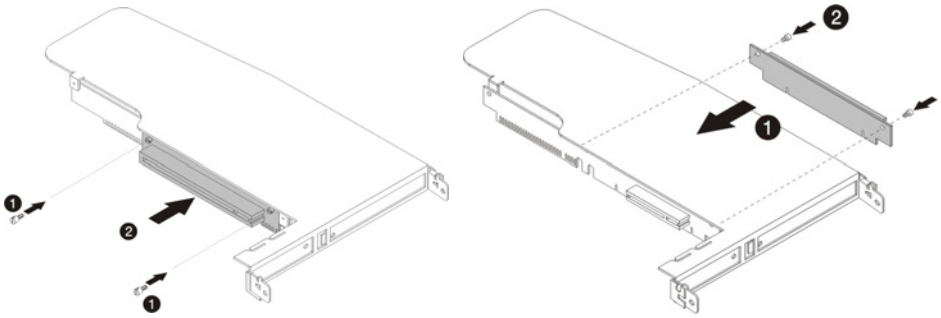
1. Remove the PCI riser board assembly following the procedures described in the previous section.
2. If an expansion board is currently installed on the PCI Express riser board(s), remove it.
3. Remove the PCI Express riser board from the assembly.
   a. Remove the three screws securing the riser board to the assembly.
      Keep these screws for installing the PCI-X riser board later.
   b. Pull the riser board away from the assembly.

Figure 43 Removing the PCI Express riser boards



4. Remove the PCI-X riser board from its protective packaging.
5. Secure the PCI-X riser board to the assembly using two of the three screws you removed in step 3-a.

Figure 44 Installing the PCI-X riser boards

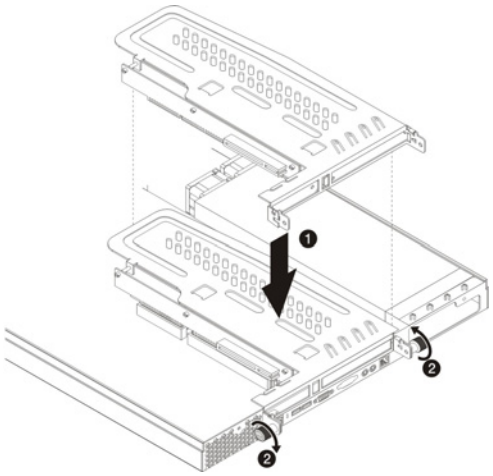


6. Reinstall the PCI riser board assembly.
   Refer to the next section for instructions.

To reinstall the PCI riser board assembly:

1. Align the assembly with the system board expansion slots, and then press it down to ensure full connection to the system board.
2. Tighten the two captive thumbscrews to secure the assembly to the chassis.

Figure 45 Reinstalling the PCI riser board assembly



3. Perform the post-installation procedure.

Installing a PCI expansion board

Guidelines for installing PCI expansion boards

The system supports up to two expansion boards at a time. Use only HP supported expansion boards that meet the following specifications:

- Compliance
  - PCI Express x8 or x16
  - PCI-X (available only when the optional PCI-X riser board is installed)
- Form factor
  - Low-profile
  - Standard height/full-length

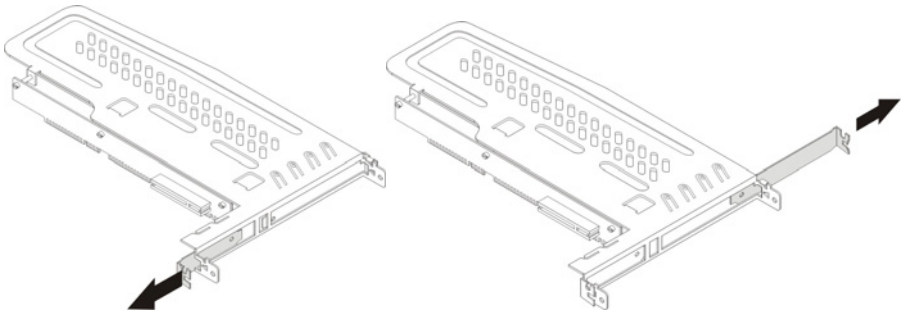
To install a PCI expansion board:

1. Remove the PCI riser board assembly.
2. Identify the slot that is compatible with the expansion board you intend to install.
3. Pull out the slot cover from the selected slot.

   Store it for reassembly later.

CAUTION: Do not discard the slot cover. If the expansion board is removed in the future, the slot cover must be reinstalled to maintain proper cooling.

Figure 46 Removing the covers of the PCI riser board expansion slots

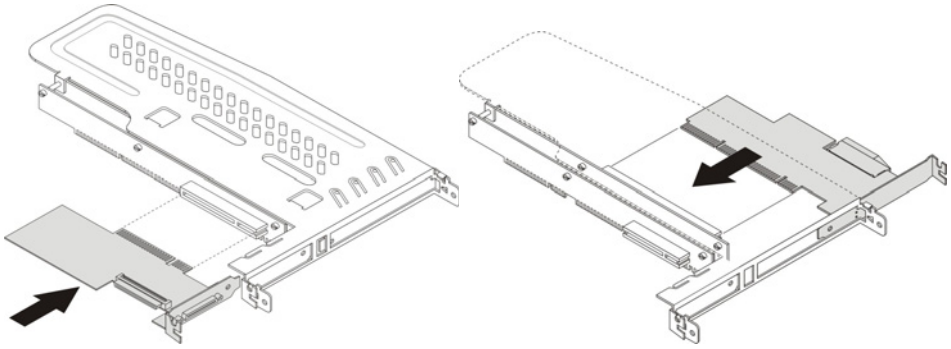


4. Remove the expansion board from its protective packaging, handling it by the edges.

   Some expansion boards can only be installed in one slot but other boards can be configured to fit in either slot by replacing the default bracket (attached to the board) with a different sized one. The different sized bracket and instructions on how to attach it to the board is included in the option kit.
5. Verify that the board's default bracket is compatible with the configuration of the selected slot.

   If it is not compatible, replace the bracket with one that is compatible.
6. Slide the expansion board into the slot, and then firmly press on it to seat it properly.

Figure 47 Installing an expansion board in the PCI riser board expansion slots



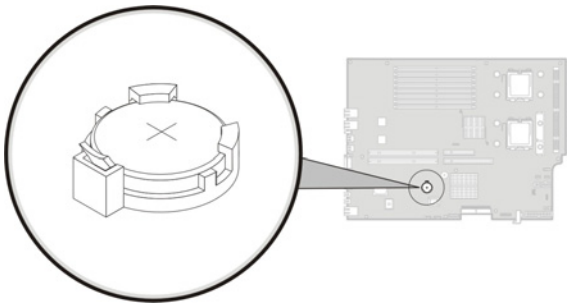
7. Connect the necessary cable(s) to the board.

   Refer to the documentation that came with the board.
8. Perform the post-installation procedure.

System battery

The HP ProLiant server uses nonvolatile memory that requires a battery to retain system information when power is removed. The battery, a 3 V 200-mAh internal lithium battery, is located on the system board (BT1).

Figure 48 System battery



If the server no longer automatically displays the correct date and time, the system battery that provides power to the real-time clock may need to be replaced. Under normal use, battery life is 5 to 10 years.

System battery replacement warnings

Observe the following precautions when replacing the system battery:

- Replace the battery with the same type as the battery recommended by HP. Use of another battery may present a risk of fire or explosion.
- A risk of fire and chemical burn exists if the battery is not handled properly. Do not disassemble, crush, puncture, or short external contacts, or expose the battery to temperatures higher than 60°C (140°F).
- Do not dispose of used battery in water or fire. Dispose of used batteries according to manufacturer's instructions.
- Loss of BIOS settings occurs when the battery is removed. BIOS settings must be reconfigured whenever the battery is replaced.

To replace the system battery:

1. Remove the PCI riser board assembly.

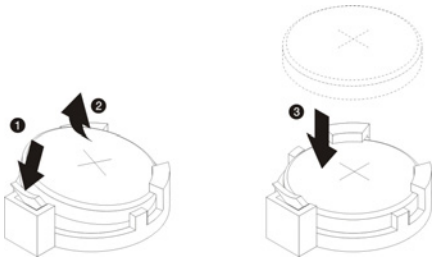
   If necessary, remove any accessory boards or cables that prevent access to the battery socket.
2. Replace the battery.

IMPORTANT: Do not bend the spring latch during battery replacement. For proper operation, the latch must maintain a position of contact with the battery.

   a. Insert a small flat-blade screwdriver or a similar tool between the battery and spring latch to dislodge the battery from its socket.
   b. Lift up the old battery to remove it.

      Insert a new battery with the positive polarity (+ side) facing up, and ensure that it is seated completely.
   c. Ensure the spring latch is in place, and that it holds the battery firmly.

Figure 49 Replacing the system battery

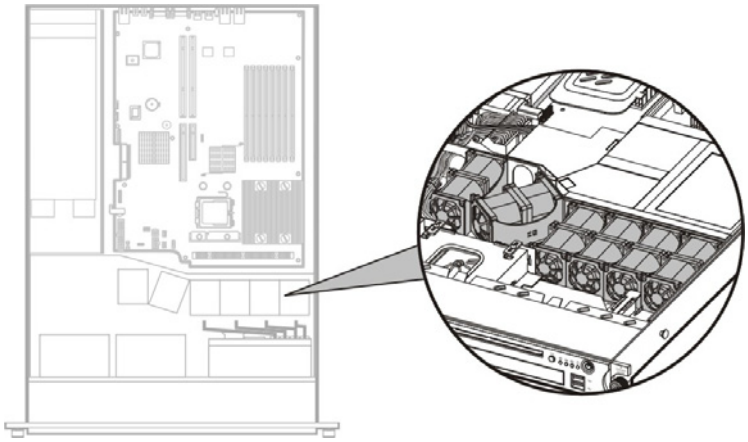


3. Perform the post-installation procedure.

System fans

The server has six system fans located on the chassis' center wall.

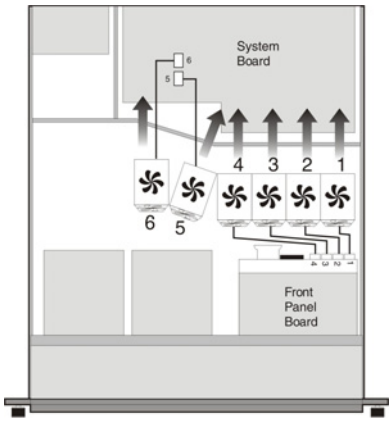
Figure 50 System fans



System fan connections

Figure 51 identifies the system fans by their device number and shows their corresponding cable connections.

Figure 51 System fan connections



Device number	Connector
System fan 1 to 4	CN3 to CN6 on the front panel board
System fan 5	CN9 on the system board
System fan 6	CN8 on the system board

NOTE: System fans 1 to 5 are for the memory modules and processors, while system fan 6 is for the PCI slots and system chipsets.

To replace the system fan:

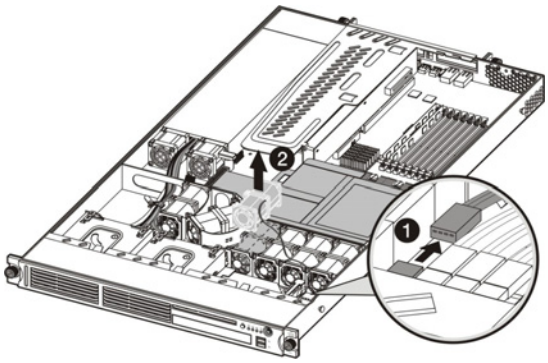
A new system fan can be installed to allow the server to operate properly in case a default system fan becomes defective.

1. Perform the pre-installation procedure.
2. Locate the system fan you want to replace.
3. Remove the system fan you want to replace.
   a. Disconnect the fan cable from its corresponding board connector.

      If you are replacing system fan 1 – 4, release the fan cable from the cable clips securing it to the base of the chassis.

      If you are replacing system fan 5 or 6, pull the fan cable through the opening in the center wall
   b. Tug the fan cable upward to release the fan from its bracket, and then pull the fan away from the bracket.

Figure 52 Removing a system fan

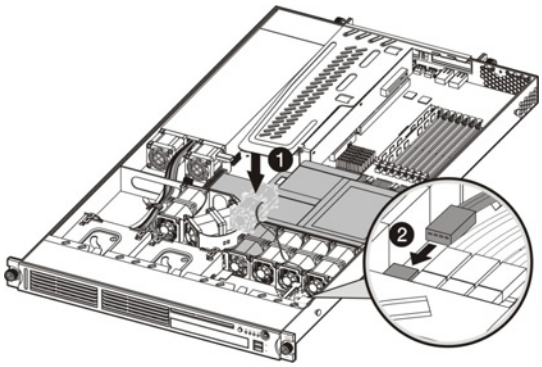


4. Install a new system fan.
   a. Insert the new fan into the vacated fan bracket.
   b. Connect the fan cable to its corresponding board connector.

      If you are replacing system fan 1 – 4, connect the fan cable to the corresponding connector on the front panel board, and then secure it through its fastener on the base of the chassis.

      If you are replacing system fan 5 or 6, route the fan cable through the opening in the center wall, and then connect them to their corresponding connectors on the system board.

Figure 53 Installing a system fan

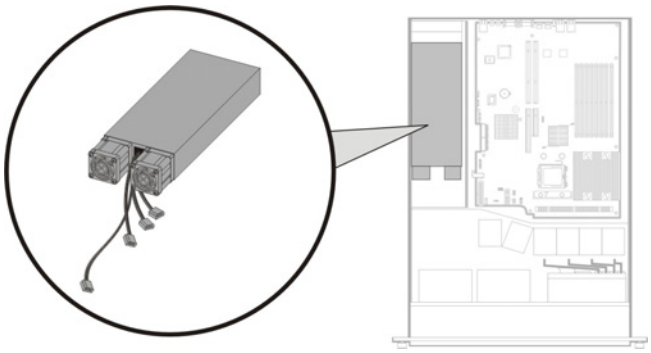


5. Perform the post-installation procedure.

Power supply unit

Located on the rear panel of the server is a single standard autoranging 650-watts PSU with PFC (power factor correction) function.

Figure 54 Power supply unit



PSU replacement warnings

Observe the following reminders to reduce the risk of personal injury from electric shock hazards and/or damage to the equipment

- Installation of the power supply unit should be referred to individuals who are qualified to service server systems and are trained to deal with equipment capable of generating hazardous energy levels.
- DO NOT open the power supply unit. There are no serviceable parts inside it.

To replace the power supply unit:

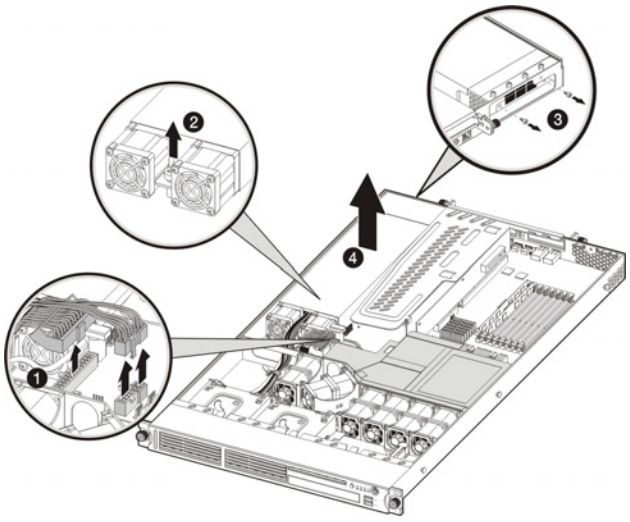
1. Perform the pre-installation procedure.
2. Remove the default PSU.

   Keep the three screws you removed in this step for installing the new PSU later.

   a. Disconnect the processor power cable, the system board power cable, and the PSU I^2C cable from the system board (CN15, CN21, and CN18 respectively), and then disconnect the power cables of all installed drives from the PSU.
   b. Remove the PSU mounting screw located between the PSU fans.
   c. Remove the two PSU mounting screws located in the rear panel.

d. Lift the PSU away from the chassis.

Figure 55 Removing the power supply unit



3. Install the new PSU.

CAUTION: Do not over tighten the PSU's screws to prevent them from breaking off. A maximum torque of 7 ± 1 is set for the system.

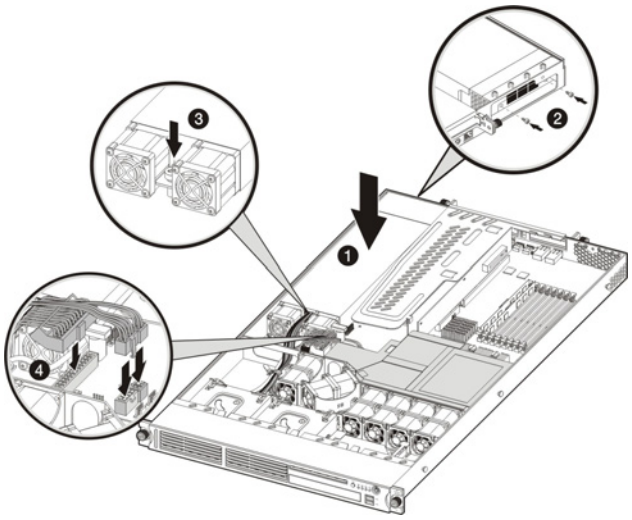
a. Position the new PSU in the PSU section of the chassis.

b. Insert the PSU mounting screw located between the PSU fans.

c. Insert the two PSU mounting screws located in the rear panel.

d. Reconnect the processor power cable, the system board power cable, and the PSU I^2C cable to their respective system board connectors, and then reconnect the power cables of all installed drives to the PSU.

Figure 56 Installing the power supply unit



4. Perform the post-installation procedure.

Diagnostic tools

Diagnostic tools overview

The following utilities assist in diagnosing problems, testing hardware, and monitoring and managing server operations.

Table 3 Diagnostic tools

Tool	What it is	How to run it
User Diagnostics	A tool to assist testing and/or verifying operation of hardware. If problems are found, the diagnostics package isolates failures down to the replaceable part, whenever possible.	Diagnostics and utilities must be accessed when a system configuration error is detected during POST. Check the HP website at **www.hp.com** for the most recent version of the HP ProLiant DL140 Generation 3 User Diagnostics.
IPMI Event Log	The IPMI Event Log is a log that is generated by the management controller (U45) when it detects significant or critical system management events. This includes messages for events such as 'temperature threshold exceeded', 'voltage threshold exceeded', 'power fault', etc.	To view the IPMI event log: **1** Access the *Phoenix*BIOS Setup Utility. **2** In the Advanced menu screen, select the **IPMI** field, and then press **Enter**. **3** Select **System Event Log**, and then press **Enter**.
*Phoenix*BIOS Setup Utility	A hardware configuration program used to manage memory, processor, and system settings.	Run BIOS Setup directly by pressing the **F10** key during POST. Refer to the "Running the Setup Utility" section on page 65 for more information.
HP ROMPaq Utility	A utility that upgrades the current system ROM.	Run this utility from the HP ROMPaq Utility bootable floppy after powering up the server. Check the HP website at **www.hp.com** for the most recent version of the HP ProLiant DL140 Generation 3 ROM.

NOTE: For more information about the diagnostic tools described in this table, and other tools available for your server, refer to the Servers Troubleshooting Guide located inside the HP ProLiant DL140 Generation 3 Server Support CD. For the most recent version of this guide, go to www.hp.com.

*Phoenix*BIOS software

*Phoenix*BIOS software is a ROM BIOS-based diagnostic tool that monitors system activity and performs constant hardware testing to ensure proper system operation. ROM BIOS is a set of programs permanently stored in an EEPROM chipset (U64) located on the system board. These programs micro-manage the hardware devices installed on your server.

The *Phoenix*BIOS software serves three functions:

- Configure the system settings via the *Phoenix*BIOS Setup Utility

  Using the Setup program, you can install, configure, and optimize the embedded hardware devices on your system (clock, memory, disk drives, etc.).
- Initialize hardware at boot via POST routines

  At power-on or reset, the software performs POST routines to test system resources and load the operating system.
- Perform run-time routines

  Using the software, perform basic hardware routines that can be called from DOS and Windows applications.

PhoenixBIOS Setup Utility

NOTE: NOTE: For ease of reading, PhoenixBIOS Setup Utility will be simply referred to as "Setup" or "Setup Utility" in this guide. Also, the screenshots used in this guide display various Setup menu screens with default values identified. These values may not be the same those in your server.

*Phoenix*BIOS Setup Utility is a hardware configuration program built into your system's Basic Input/Output System (BIOS). Since most systems are already properly configured and optimized, there is normally no need to run this utility.

You will need to run this utility under the following conditions:

- When changing the system configuration including:
  - Setting the system time and date
  - Configuring the hard drives
  - Specifying the boot device sequence
  - Installing PCI expansion boards
  - Upgrading the system BIOS
  - Configuring the power management modes
  - Setting up system passwords or making other changes to the security setup
- When a configuration error is detected by the system and you are prompted ("Run Setup" message) to make changes to the BIOS settings.

NOTE: If you repeatedly receive "Run Setup" messages, the battery (BT1) located on the system board may be defective. In this case, the system cannot retain configuration values in CMOS. Ask a qualified technician for assistance.

The Setup Utility loads the configuration values in a battery-backed nonvolatile memory called CMOS RAM. This memory area is not part of the system RAM, which allows configuration data to be retained when power is turned off. The values take effect when the system is booted. POST uses these values to configure the hardware. If the values and the actual hardware do not agree, POST generates an error message. You must run this utility to change the BIOS settings from the default or current configuration.

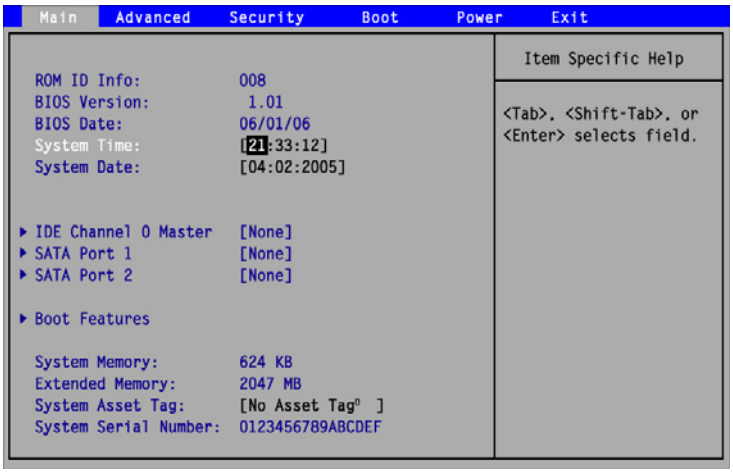
Running the Setup Utility

1. Turn on the monitor and the server.
2. If the server is already turned on, save your data and exit all open applications, and then restart the server.
3. During POST, press **F10**.

   If you fail to press **F10** before POST is completed, you will need to restart the server.

   The first page to be displayed will be the Main menu showing the Setup Utility's menu bar. Use the left (←) and right (→) arrow keys to move between selections on the menu bar.

Figure 57 Setup Utility's Main menu



Navigating through the Setup Utility

Use the keys listed in the legend bar on the bottom of the Setup screen to work your way through the various menu and submenu screens of the Setup Utility.

Table 4 Setup Utility's navigation keys

Key	Functions
← and →	To move between selections on the menu bar.
↑ and ↓	To move the cursor to the field you want. The currently selected field will be highlighted. The right side of each menu screen displays the Item Specific Help panel. This panel displays the help text for the currently selected field. It updates as you move the cursor to each field.
PgUp and PgDn	To move the cursor to the previous and next page of a multiple page menu.
Home	To move the cursor to the first page of a multiple page menu.
End	To move the cursor to the last page of a multiple page menu.
(+) , (–), and <Space>	To select a value for the currently selected field (only if it is user-configurable). Press the (+), (–), or <Space> keys repeatedly to display each possible entry, or the **Enter** key to choose from a pop-up menu. A parameter that is enclosed in square brackets [ ] is user-configurable. Grayed-out parameters are not user-configurable for one of the following reasons: • The field value is auto-configured or auto-detected. • The field value is informational only. • The field is password-protected.
Enter	To select a field value or display more options for menu marked with ►.
Ctrl+Enter	To expands all device list.
F1 or <Alt+H>	To bring up the General Help window. The General Help window describes other Setup navigation keys that are not displayed on the legend bar.
Esc or <Alt+X>	If you press this key: • On one of the primary menu screens, the Exit menu displays. • On a submenu screen, the previous screen displays. • When you are making selections from a pop-up menu, closes the pop-up without making a selection.
F9	Loads the default system values.
F10	Saves changes and closes the Setup Utility.

Setup Utility menus

The Setup Utility provides a menu bar with the menu selections. The menu bar choices are described in the.

Table 5 Setup Utility's primary menus

Menu	Function
Main	Use this menu to: • View BIOS information including ROM ID, version number and build date • Set the system time and date. • Configure drive settings for available IDE and SATA devices. • Select which options to run during system boot-up. • View the amount of available conventional and extended memory detected during boot-up. • Enter the server asset tag and serial number.
Advanced	Use this menu to: • Clear all configuration data in a section of memory for ESCD (Extended System Configuration Data), which stores the configuration settings for non-PnP plug-in devices. • View the MAC (Media Access Control) address of each of the three LAN ports. • Select a memory branch mode and related setting. • Enable or disable support for PATA and SATA devices. • Select which functions to enable for available USB devices. • Configure the hardware settings for the processors, the onboard Ethernet controllers, the expansion slots, and the serial port. • Configure console redirection settings. • Console redirection allows the system to be displayed on a remote terminal for online server management. • View the specification version for the IPMI and BMC firmware • Configure LAN related-settings. • View and/or clear the event log. • View real-time system temperature and voltage data. • Enable or disable the hardware watchdog timer. **CAUTION:** Be cautious in setting field values in this menu as any incorrect value may cause the system to malfunction.
Security	Use this menu to set an administrator password to prevent unauthorized access to the Setup utility. Refer to the “Administrator password” section on the next page for more information on using this menu.
Boot	Use this menu to set the preferred drive sequence in which the Setup Utility attempts to boot the operating system. Options for enabling the PXE function of the LAN ports are also available. By default, the server searches for boot devices in the following order: **1** CD-ROM drive (IDE and USB CD-ROM drives) **2** Removable device **3** Hard drive **4** Embedded NIC1* **5** Embedded NIC2* * Via PXE (Preboot Execution Environment, remote boot)

Table 5 Setup Utility's primary menus

Menu	Function
Power	Use this menu to: • Enable or disable the modem ring power-up function. • Enable or disable the WOL (Wake-On-LAN) function of the onboard LAN controllers (U20 and U30) • Set the mode of operation if a power loss occurs.
Exit	Use this menu to select an exit option to quit from the Setup Utility. Options include: • Exit Saving Changes - Saves changes made and close the Setup Utility. Keyboard shortcut: **F10** • Exit Discarding Changes - Discards changes made and close the Setup Utility. • Load Setup Defaults - Loads the factory-default settings for all Setup parameters. Keyboard shortcut: **F9** • Discard Changes - Discards all changes made to the Setup Utility and loads previous configuration settings. • Save Changes - Saves all changes made to the Setup Utility.

Administrator password

The Security menu allows users to set an administrator password. When entered, this password will allow the user to access and change all settings in the Setup Utility.

To set an administrator password:

1. In the Security menu screen, select the **Administrator Password Is** field then press **Enter**.

Figure 58 Setting an administrator password

2. Type a new password in the password box.
   The password may consist of up to eight alphanumeric characters (A-Z, a-z, 0-9).
3. Retype the password to verify the first entry, and then press **Enter**.
4. Press **F10** to save the password and close the Setup Utility.
   After setting the password, Setup automatically sets the selected password field to **Enabled**.

To change the administrator password:

1. In the Security menu screen, select the **Administrator Password Is** field, and then press **Enter**.
2. Type the original password in the password box.
3. Type a new password, and then press **Enter**.
4. Retype the new password to verify the first entry, and then press **Enter** again.
5. Press **F10** to save the password and close the Setup Utility.

To remove the administrator password:

1. In the Security menu screen, select the **Administrator Password Is** field, and then press **Enter**.
2. Type the original password, and then press **Enter**.
3. Press **Enter** twice without entering anything in the new and confirm password fields.
4. Press **F10** to save the changes you made and close the Setup Utility.
5. Setup automatically sets the selected password field to **Clear**.

To reset the administrator password:

If you forget the administrator password, you need to clear the CMOS and reset the BIOS settings to regain access the Setup Utility. For instructions, refer to the "Clearing CMOS" section on page 72.

Boot-time diagnostic screen

The boot-time diagnostic screen displays basic and important information about the current server configuration and is necessary for troubleshooting and may be required when asking for technical support. This information includes:

- Processor specifications
- BIOS version and release date
- BMC firmware version
- Size of the system and video memory, as well as the memory size allotted for the cache RAM and option ROM
- Serial port base I/O address
- Available hard drives and expansion boards
- Server asset tag and serial number
- MAC address of each of the three LAN ports

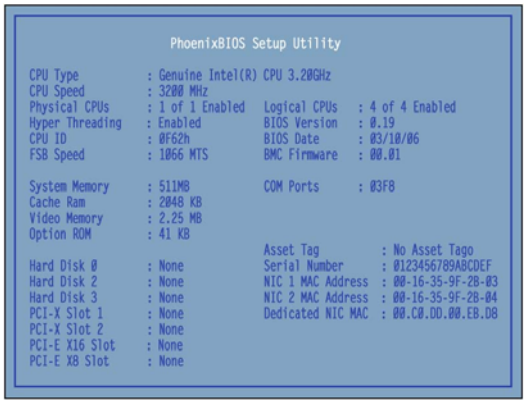
It is recommended that you check this screen during the initial system setup and each time you install, remove, or upgrade accessories.

To view the boot-time diagnostic screen:

You first need to enable the display of the diagnostic screen during bootup. Follow the steps below.

1. In the Main menu screen, select **Boot Features**.
2. Select the **Summary Screen** field.
3. Press the plus (+) or minus (-) key to set the field to **Enabled**.
4. Press **F10** to save the changes you made and close the Setup Utility.
5. Reboot the server.

   The diagnostic screen is displayed briefly at the end of POST.


PhoenixBIOS Setup Utility
CPU Type : Genuine Intel(R) CPU 3.20GHz
CPU Speed : 3200 MHz
Physical CPUs : 1 of 1 Enabled
Logical CPUs : 4 of 4 Enabled
Hyper Threading : Enabled
BIOS Version : 0.19
CPU ID : 0F62h
BIOS Date : 03/10/06
FSB Speed : 1066 MTS
BMC Firmware : 00.01
System Memory : 511MB
COM Ports : 03F8
Cache Ram : 2048 KB
Video Memory : 2.25 MB
Option ROM : 41 KB
Asset Tag : No Asset Tago
Hard Disk 0 : None
Serial Number : 0123456789ABCDEF
Hard Disk 2 : None
NIC 1 MAC Address : 00-16-35-9F-2B-03
Hard Disk 3 : None
NIC 2 MAC Address : 00-16-35-9F-2B-04
PCI-X Slot 1 : None
Dedicated NIC MAC : 00.C0.DD.00.EB.D8
PCI-X Slot 2 : None
PCI-E X16 Slot : None
PCI-E X8 Slot : None

6. Press the **Pause/Break** key to continue displaying the screen until another key is pressed.
7. Press any key to continue with the system bootup.

Recording custom Setup values

Keep a record of the custom Setup values you have set up for your system BIOS. If the custom values ever need restoring (after a CMOS clear, for example), you must run the Setup Utility and enter these custom settings again. Make sure to update this record whenever you make any change to these Setup settings or install new hardware.

You can either record the Setup values manually (hard copy) or use a CMOS backup utility.

To manually record the custom Setup values:

1. Access the Setup utility.
2. Go through each menu and submenus page, and press **Print Screen** to make a hard copy.

   For multiple page menus, move to each page and print each screen.
3. If a printer is not available, write down the values on a piece of paper. Make sure to write them down legibly and accurately.
4. Label and date the Setup values hard copy, and then store it in a safe and accessible place, preferably with other user documentation for your ProLiant server.

CMOS backup utility

There are third-party utilities that read the CMOS settings and record them to a regular file, which can then be backed up through normal means, or copied to an external storage media. Some of these utilities also offer the option of restoring the CMOS settings so you need not re-enter them manually.

These utilities are not always compatible with all versions of CMOS or types of CMOS. In addition, these utilities are not compatible with all operating system versions. Be sure to use a CMOS backup utility that is designed for the particular CMOS type and OS version installed in your ProLiant server. For information on a compatible CMOS backup utility, contact your local HP representative.

Loading system defaults

If your system fails after you make changes in the Setup menus, reboot the server, enter Setup and load the system default settings to correct the error. These default settings have been selected to optimize your server's performance.

To load the system defaults:

1. Reboot the server in a normal manner.
2. During POST, press **F10** to access the Setup Utility.
3. Press **F9** to load the default values.
4. Press **F10** to save the changes you made and close the Setup Utility.

Clearing CMOS

You may need to clear the Setup configuration values (CMOS) if the configuration has been corrupted, or if incorrect settings made in the Setup Utility have caused error messages to be unreadable. Clearing the CMOS data removes the administrator password.

The clear CMOS switch is switch 2 of the system configuration switch (SW2). Go to page 84 for the location of this switch.

To clear CMOS:

1. Remove the top cover following the procedures described on page 31.
2. If necessary, remove any expansion boards, assemblies or cables that prevent access to the system configuration switch.
3. Locate the system configuration switch (SW2) on the system board.
4. Identify SW2-2 of the switch.

   By default, SW2-2 is set to the **Off** position.
5. Set SW2-2 to the **On** position.

   This will clear the CMOS memory.
6. Switch SW2-2 back to its default **Off** position.
7. Perform the post-installation procedure described on page 29.
8. During POST, press **F10** to access the Setup Utility.
9. Press **F9** to load the system default values.
10. Press **F10** to save the changes you made and close the Setup Utility.

Power-On Self-Test (POST)

Before you can use a server, all devices must be tested and initialized, and the operating system must be bootstrapped to the memory. This is referred to as Power–On Self–Test or POST. POST is a series of diagnostic tests that checks firmware and hardware components to ensure that the server is properly functioning. This diagnostic function automatically runs each time the server is powered on.

These diagnostics, which reside in the BIOS ROM, isolate server-related logic failures and indicate the board or component that needs to be replaced, as indicated by the error messages. Most server hardware failures will be accurately isolated during POST. The number of tests displayed depends on the configuration of the server.

During POST you can press:

- **Esc** to skip the HP logo and go to POST boot progress display system summary screen.
- **F7** to display the Boot menu.
- **F10** to access the Setup Utility.
- **F12** to request a network boot (PXE).

POST error indicators

When POST detects a system failure, it either displays a POST error message, or emits a series of beep codes.

POST errors messages

Whenever a non-fatal error occurs during POST, an error message describing the problem appears onscreen. These text messages are displayed in normal video (white text on black background). It shows the details of the error. The following is an example of a POST error message:

```
Error message 1 of 1:  Error code 0103
Keyboard not detected - Keyboard error
```

In some cases an error message may include recommendations for troubleshooting or require that you press the **Enter** key to display recommendations. Follow the instructions on the screen.

Table 6 lists the most common POST error messages with their corresponding troubleshooting recommendation. It is recommended that you correct the error before proceeding, even if the server appears to boot successfully.

If your system displays one of the messages marked below with an asterisk (*), write down the code and message and contact your HP Customer Support provider.

When no POST error message is displayed but the server stops during POST, listen for beep codes.

Table 6 POST error messages

Error code	Error message	Corrective action
0200	Failure Fixed Disk	Fixed disk is not working or not configured properly. **6** Run Setup and check if the fixed-disk type is correctly identified. **7** Check to see if fixed disk is attached properly.
0210	Stuck key	Stuck key on keyboard. **8** Locate the stuck key on your keyboard and release it. **9** Reboot the server.
0211	Keyboard error	Keyboard not working. Verify that the keyboard cable is securely connected to the keyboard port (not the mouse port) on the rear panel of the server. If the problem persists, replace the keyboard or contact your HP Customer Support provider.
0212	Keyboard Controller Failed	Keyboard controller failed test.
0220	Monitor type does not match CMOS - Run SETUP	The attached monitor cannot be correctly identified by Setup. Run Setup and check if the monitor type is correctly identified.
0250	System battery is dead - Replace and run SETUP	The CMOS clock battery indicator shows the system battery is dead. **10** Replace the system battery following the procedures on page 58. **11** Run Setup to reconfigure the system.

Table 6 POST error messages

Error code	Error message	Corrective action
0251	System CMOS checksum bad - Default configuration used	The settings in the Setup Utility have been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. You can either load the system default values or access Setup and enter your own custom values. If the error persists, check the system battery or contact your HP Customer Support provider.
0260	System timer error	The timer test failed. Requires repair of the system board.
0270	Real time clock error	Real-Time Clock (RTC) fails BIOS hardware test. May require board repair.
0271	Check date and time settings	BIOS found date or time out of range and reset the RTC. May require setting legal date (1991-2099). Access Setup and check the values in the **System Time** and S**ystem Date** fields of the Main menu.
0280	Previous boot incomplete – Default configuration used	Initial bootup failed. BIOS automatically loads the default system values, and then boots again.
0281	Memory size found by POST differed from CMOS	The user added or removed a memory module, thus the system memory size is different from the previous bootup value.
02F5	DMA test failed	The DMA control test failed.
02F6	Software NMI failed	An NMI signal is detected and/or user has pressed the NMI switch.

POST beep codes

There are several POST routines that issue a POST terminal error and shut down the system if they fail. Before shutting down the system, the terminal-error handler issues a beep code signifying the test point error, writes the error to port 80h, attempts to initialize the video, and writes the error in the upper left corner of the screen (using both mono and color adapters).

The POST routines cannot display messages when an error occurs if any of the following are present:

- The error occurs before the video display is initialized.
- The video configuration fails, either there's no graphics card installed or the one installed is faulty.
- An external ROM module does not properly checksum to zero.
- The system memory cannot be initialized.

During these instances the server unit emits a buzzing sound followed by a series of audible beeps. An external ROM module (e.g. VGA) can also issue audible errors, usually consisting of one long tone followed by a series of short tones. If you get a blank screen on boot, but hear beeps, count the beeps and refer to the following table for their corresponding meaning. If you miss the beep code:

1. Turn off the server by pressing the power button for five seconds or more.
2. Restart the server by pressing the power button.
3. Listen for the signal again.

The routine derives the beep code from the test point error as follows:

1. The 8-bit error code is broken down to four 2-bit groups (Discard the most significant group if it is 00).
2. Each group is made one-based (1 through 4) by adding 1.
3. Short beeps are generated for the number in each group.

   Example:

   Test point 01Ah = 00 01 10 10 = 1-2-3-3 beeps

Table 7 lists the checkpoint codes written at the start of each test and the beep codes issued for terminal errors.

Table 7 POST beep codes

Code	Beep	Description
02h		Verify real mode
03h		Disable non-maskable interrupts
04h		Get processor type
06h		Initialize system hardware
07h		Disable shadow and execute code from the ROM
08h		Initialize chipset with initial POST values
09h		Set IN POST flag
0Ah		Initialize processor registers
0Bh		Enable processor cache
0Ch		Initialize caches to initial POST values
0Eh		Initialize I/O component
0Fh		Initialize the local bus IDE
10h		Initialize power management
11h		Load alternate registers with initial POST values
12h		Restore processor control word during warm boot
13h		Initialize PCI bus mastering devices
14h		Initialize keyboard controller
16h	1-2-2-3	BIOS ROM checksum
17h		Initialize cache before memory auto size
18h		8254 timer initialization
1Ah		8237 DMA controller initialization
1Ch		Reset programmable interrupt controller
20h	1-3-1-1	Test DRAM refresh
22h	1-3-1-3	Test 8742 keyboard controller

Table 7 POST beep codes

Code	Beep	Description
24h		Set ES segment register to 4 GB
28h		Auto size DRAM
29h		Initialize POST Memory Manager
2Ah		Clear 512 KB base RAM
2Ch	1-3-4-1	RAM failure on address line xxxx
2Eh	1-3-4-3	RAM failure on data bits xxxx of low byte of memory bus
2Fh		Enable cache before system BIOS shadow
32h		Test processor bus-clock frequency
33h		Initialize Phoenix Dispatch Manager
36h		Warm start shut down
38h		Shadow system BIOS ROM
3Ah		Auto size cache
3Ch		Advanced configuration of chipset registers
3Dh		Load alternate registers with CMOS values
41h		Initialize extended memory for ROM pilot
42h		Initialize interrupt vectors
45h		POST device initialization
46h	2-1-2-3	Check ROM copyright notice
47h		Initialize I20 support
48h		Check video configuration against CMOS
49h		Initialize PCI bus and devices
4Ah		Initialize all video adapters in system
4Bh		Quiet boot start (optional)
4Ch		Shadow video BIOS ROM
4Eh		Display BIOS copyright notice
4Fh		Initialize multi-boot
50h		Display processor type and speed
51h		Initialize EISA board
52h		Test keyboard
54h		Set key click if enabled
55h		Enable USB devices
58h	2-2-3-1	Test for unexpected interrupts

Table 7 POST beep codes

Code	Beep	Description
59h		Initialize POST display service
5Ah		Display prompt "Press F10 to enter SETUP"
5Bh		Disable processor cache
5Ch		Test RAM between 512 and 640 KB
60h		Test extended memory
62h		Test extended memory address lines
64h		Jump to user patch 1
66h		Configure advanced cache registers
67h		Initialize multiprocessor APIC
68h		Enable external and processor caches
69h		Setup System Management Mode (SMM) area
6Ah		Display external L2 cache size
6Bh		Load custom defaults (optional)
6Ch		Display shadow-area message
6Eh		Display possible high address for UMB recovery
70h		Display error messages
72h		Check for configuration errors
76h		Check for keyboard errors
7Ch		Set up hardware interrupt vectors
7Dh		Initialize Intelligent System Monitoring
7Eh		Initialize coprocessor if present
80h		Disable onboard super I/O ports and IRQs
81h		Late POST device initialization
82h		Detect and install external RS232 ports
83h		Configure non-MCD IDE controllers
84h		Detect and install external parallel ports
85h		Initialize PC-compatible PnP ISA devices
86h		Re-initialize onboard I/O ports.
87h		Configure system board configurable devices (optional)
88h		Initialize BIOS data area
89h		Enable non-maskable interrupts
8Ah		Initialize extended BIOS data area

Table 7 POST beep codes

Code	Beep	Description
8Bh		Test and initialize PS/2 mouse
8Ch		Initialize floppy controller
8Fh		Determine number of ATA drives (optional)
90h		Initialize hard disk controllers
91h		Initialize local bus hard disk controllers
92h		Jump to user patch 2
93h		Build MP table for multi-processor boards
95h		Install CD-ROM for boot
96h		Clear huge ES segment register
97h		Fix up MP table
98h	1-2	Search for option ROMs. One long, two short beeps on checksum failure
99h		Check for SMART drive (optional)
9Ah		Shadow option ROMs
9Ch		Set up power management
9Dh		Initialize security engine (optional)
9Eh		Enable hardware interrupts
9Fh		Determine number of SATA and/or SAS drives
A0h		Set time of day
A2h		Check key lock
A4h		Initialize typematic rate
A8h		Erase F10 prompt
AAh		Scan for F10 key stroke
ACh		Enter Setup
AEh		Clear boot flag
B0h		Check for errors
B1h		Inform ROM pilot about the end of POST.
B2h		POST done, prepare to boot operating system
B4h	1	One short beep before boot
B5h		Terminate quiet boot (optional)
B6h		Check password (optional)
B7h		Initialize ACPI BIOS
B9h		Prepare boot

Table 7 POST beep codes

Code	Beep	Description
BAh		Initialize SMBIOS
BBh		Initialize PnP option ROMs
BCh		Clear parity checkers
BDh		Display Multi-boot menu
BEh		Clear screen (optional)
BFh		Check virus and backup reminders
C0h		Try to boot with INT 19
C1h		Initialize POST Error Manager (PEM)
C2h		Initialize error logging
C3h		Initialize error display function
C4h		Initialize system error handler
C5h		PnP and dual CMOS (optional)
C6h		Initialize note dock (optional)
C7h		Initialize note dock late
C8h		Force check (optional)
C9h		Extended checksum (optional)
CAh		Redirect Int 15h to enable remote keyboard
CBh		Redirect Int 13h to memory technologies devices such as ROM, RAM, PCMCIA, and serial disk
CCh		Redirect Int 10h to enable remote serial video
CDh		Re-map I/O and memory for PCMCIA
CEh		Initialize digitizer and display message
D2h		Unknown interrupt
The following are for boot block in flash ROM.		
E0h		Initialize the chipset
E1h		Initialize the bridge
E2h		Initialize the processor
E3h		Initialize system timer
E4h		Initialize system I/O
E5h		Check force recovery boot
E6h		Checksum BIOS ROM
E7h		Go to BIOS
E8h		Set huge segment

Table 7 POST beep codes

Code	Beep	Description
E9h		Initialize multiprocessor
EAh		Initialize OEM special code
EBh		Initialize PIC and DMA
ECh		Initialize memory type
EDh		Initialize memory size
EEh		Shadow boot block
EFh		System memory test
F0h		Initialize interrupt vectors
F1h		Initialize runtime clock
F2h		Initialize video
F3h		Initialize System Management Manager
F4h		Output one beep
F5h		Clear huge segment
F6h		Boot to mini DOS
F7h		Boot to full DOS

Troubleshooting resources

NOTE: For common troubleshooting procedures, the term "server" is used to mean servers and server blades.

The HP ProLiant Servers Troubleshooting Guide provides simple procedures for resolving common problems as well as a comprehensive course of action for fault isolation and identification, error message interpretation, issue resolution, and software maintenance.

To obtain the guide, refer to any of the following sources and then select the HP ProLiant Servers Troubleshooting Guide:

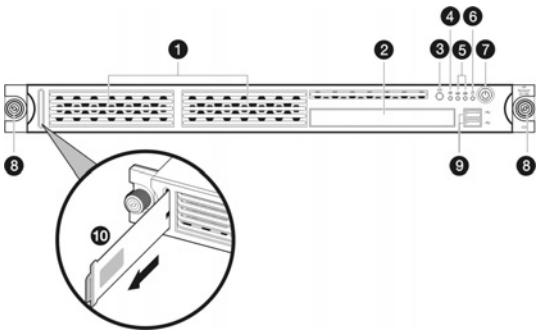
- The server-specific Documentation CD
- The Business Support Center on the HP website (**http://www.hp.com/support**). Navigate to the server technical support page. Under self-help resources, select **ProLiant Troubleshooting Guide**.
- The Technical Documentation website (**http://www.docs.hp.com**). Select **Enterprise Servers, Workstations and Systems Hardware**, and then the appropriate server.

Connectors, switches, and LEDs

Connectors and components

Front panel

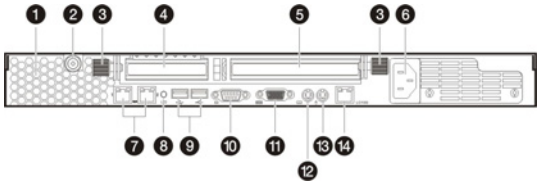
Figure 59 Front panel



Item	Icon	Component
1		Hard disk drive (HDD) bays
2		Optical media device bay
3	UID	Front unit identification (UID) button with LED indicator (blue) Press to illuminate the UID LED indicators on the front and rear panels. This is to mark a particular unit within a server group for purpose of identification during servicing or maintenance procedures.
4		System health LED indicator (amber)
5		Activity/link status LED indicators for NIC 1 and NIC 2 (green)
6		HDD activity LED indicator (green)
7		Power status LED indicator (bicolor: green/amber) • Powers up the server. • Places the server in standby mode. • Powers down the server.
8		Thumbscrews for the front bezel
9		Front USB ports
10		Serial label pull tab

Rear panel

Figure 60 Rear panel

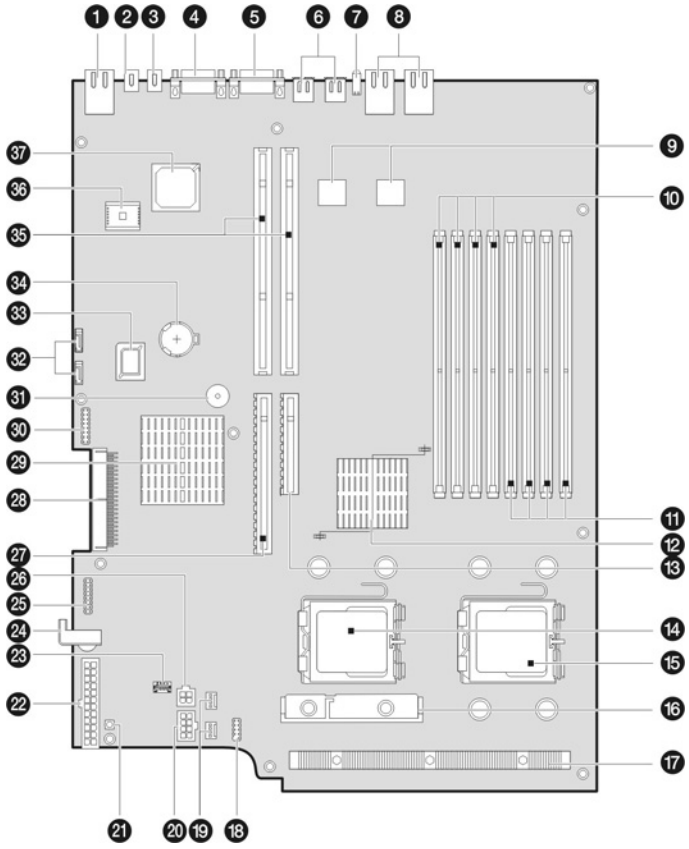


Item	Icon	Component
1		Ventilation holes
2		Thumbscrew for the top cover
3		Thumbscrews for the PCI riser board assembly
4		Low-profile PCI Express x8/PCI-X riser board slot cover
5		Standard height/full-length PCI Express x16/PCI-X riser board slot cover
6		Power supply cable socket
7		GbE LAN ports for NIC 1 and NIC 2 (RJ-45)
8	UID	Rear UID button with LED indicator (blue)
9		Rear USB ports (black)
10		Video port (blue)
11		Serial port (teal)
12		PS/2 keyboard port (purple)
13		PS/2 mouse port (green)
14	LO100i	10/100 Mbps LAN port for IPMI management (RJ-45)

Note: The three LAN ports each have its own LED indicators for activity/link status and network speed.

System board

Figure 61 System board components



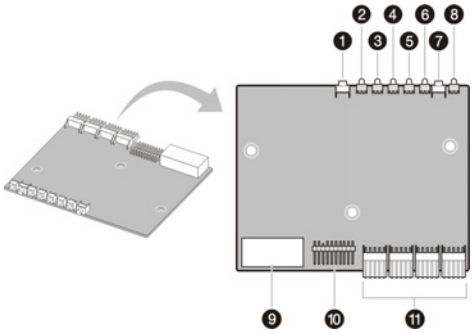
Item	Component code	Component
1	RJ3	10/100 Mbps LAN port for IPMI management
2	SKT6	PS/2 mouse port
3	SKT3	PS/2 keyboard port
4	CN7	Serial port
5	CN10	Video port
6	SKT2 and SKT1	USB ports
7	SW1	UID button with LED indicator (blue)
8	RJ1 and RJ2	GbE LAN ports for NIC 1 and NIC 2
9	U30 and U20	Broadcom BCM5721 NetXtreme Gigabit Ethernet controllers
10	DIMM1 to DIMM4	Branch 0 DIMM slots
11	DIMM5 to DIMM8	Branch 1 DIMM slots
12	U23	Intel MCH (memory controller hub) chipset (north bridge)
13	CN5	PCI Express x8 slot
14	CPU2	Intel LGA771 processor 2 socket

Item	Component code	Component
15	CPU1	Intel LGA771 processor 1 socket
16	—	Processor 2 socket air baffle
17	—	Airflow regulator for the front system fans 1 - 4
18	USBCN1	9-pin connector for the front USB ports
19	CN9 and CN8	4-pin system fan connectors (for system fans 5 and 6)
20	PWRCN1	8-pin ATX processor power connector
21	SW4	NMI button
22	PWRCN3	24-pin ATX system board power connector
23	SW2	System configuration switch
24	—	PCI retainer bracket
25	FPCN1	19-pin front panel board connector
26	PWRCN2	4-pin I^2C connector for PSU
27	U32	PCI Express x16 slot
28	IDE1	IDE data cable connector
29	U38	Intel ICH (I/O controller hub) chipset (south bridge)
30	U80	15-pin LPC debug connector
31	BUZ1	Internal buzzer
32	SATA1 and SATA2	7-pin 150-/300-MBps SATA connectors
33	U64	BIOS flash EEPROM (Electrically Erasable Programmable Read-Only Memory)
34	BT1	3 V internal lithium system battery
35	CN6 and CN4	64-bit/133 MHz 3.3 V PCI-X slots
36	SKT5	BMC flash EEPROM
37	U57	ServerEngines Pilot BMC (Baseboard Management Controller)

Front panel board

The front panel board is linked to the system board through the front panel board connector (FPCN1).

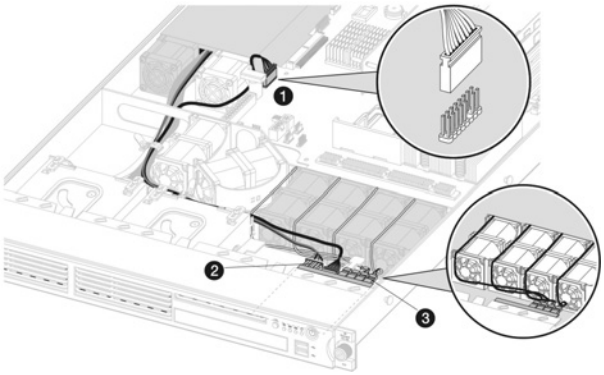
Figure 62 Front panel board



Item	Component code	Component
1	SW2	Front UID button
2	LED6	Front UID LED indicator
3	LED5	System health LED indicator
4	LED4	Activity/link LED indicator for NIC 1
5	LED3	Activity/link LED indicator for NIC 2
6	LED2	HDD activity LED indicator
7	SW1	Power button
8	LED1	Power LED indicator
9	CN1	Front panel board power connector
10	CN2	Front panel board system board connector
11	CN3 to CN6	4-pin system fan connectors

Front panel board cable connections

Figure 63 Front panel board cable connections



Item	Connector	Cable
1	CN2	Front panel board system board connector Connects to FPCN1 on the system board
2	CN1	Front panel board power connector Connects to the PSU.
3	CN3 to CN6	4-pin system fan connectors Connects to the system fans 1 to 4.

To route the front panel board cables:

CAUTION: Route the front panel board cables neatly. If necessary, secure them using the pre-installed cable clips located on the chassis base. The cables should be routed in a position where they will not be pinched or crimped by the top cover, nor should they hamper proper airflow inside the chassis.

NOTE: NOTE: For ease of reading, front panel board will be simply referred to as "FPB" in the following procedures.

1. Perform the pre-installation procedure described on page 29.
2. Remove the PCI riser board assembly.
3. Connect the FPB system board cable to the FPCN1 connector on the system board.
4. Route the FPB power and system board cables through the cable management opening of the chassis' partition wall.
5. Disconnect the drive and power cables of the available hard drives.
6. Route the FPB power and system board cables underneath the hard drive cables you disconnected in the previous step.

7. Arrange the drive and power cables of the available hard drives over the routed FPB cables, and then reconnect them to their corresponding connectors on the rear of the drives.
8. Connect the FPB cables to their FPB connectors.
   a. Connect the FPB power cable to the CN1 connector.
   b. Connect the FPB system board cable to the CN2 connector.
   c. Connect the FPB fan cables to their corresponding connectors, and then secure it through their fasteners on the base of the chassis.

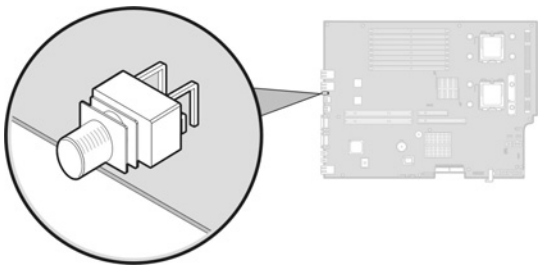
      Go to page 68 for an illustration of the system fan cable connections.
9. Perform the post-installation procedure described on page 29.

System switches

Rear UID button with LED indicator (SW1)

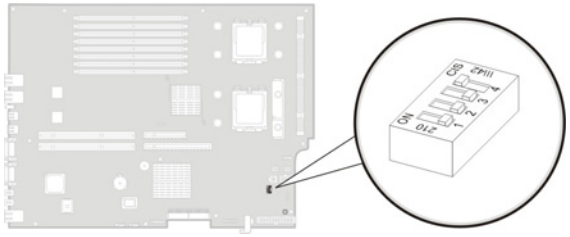
This button is accessible through the rear panel. Press it to illuminate the UID LED indicators on the front and rear panels. This is to mark a particular unit within a server group for purpose of identification during servicing or maintenance procedures. This function is mirrored by the UID button located on the front panel.

Figure 64 Rear UID button with LED indicator



System configuration switch (SW2)

Figure 65 System configuration switch



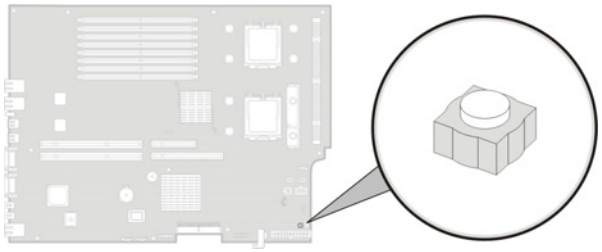
Switch	Status	Function
SW2-1	On	Boot block enabled
	Off	Normal boot
SW2-2	On	Clear CMOS settings and restore system defaults
	Off	Normal CMOS settings
SW2-3	—	Reserved
SW2-4	—	Reserved

NOTE: The status indicated in **bold text** is the default setting.

NMI button (SW4)

If the system crashes or stops operating properly, you can use the NMI button (SW4) to mechanically force the server to issue a non-maskable interrupt. This will perform a memory dump—writing the contents of the server's CPU registers and RAM to a network server or to diskettes. This memory dump can later be analyzed to determine the cause of the problem. By default, the NMI switch is always enabled.

Figure 66 NMI button



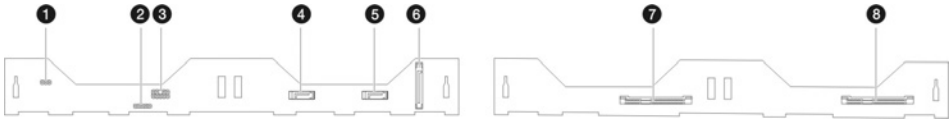
NOTE: Use of the NMI button is not supported in all NOS. As of the present, NMI implementation is not available for systems running on Solaris and Linux operating systems.

Hot-plug HDD peripherals

Hot-plug backplane board

If you are switching from a non-hot-plug SATA hard drive system to a hot-plug SATA/SAS one, you will need to install the hot-plug backplane board (HPBB). This backplane board supports both SATA and SAS functions. Go to page 40 for instructions on how to install this board.

Figure 67 Hot-plug backplane board connectors



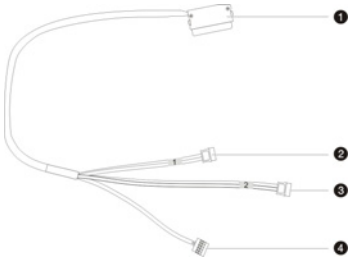
Component side Solder side

Item	Connector code	Connector
1	CN3	3-pin I^2C connector
2	CN5	5-pin ISP connector
3	CN6	9-pin HDD LED cable connector
4	SAS2/SATA2	HDD 2 data cable connector
5	SAS1/SATA1	HDD 1 data cable connector
6	CN7	15-pin HDD power cable connector
7	CN2	HPBB HDD 1 connector
8	CN1	HPBB HDD 2 connector

Hot-plug cable

If you are switching from a non-hot-plug SATA hard drive system to a hot-plug SATA/SAS one, you will need to install the hot-plug cable. This cable supports both SATA and SAS functions. Go to page 41 for instructions on how to install this cable.

Figure 68 Hot-plug cable connectors



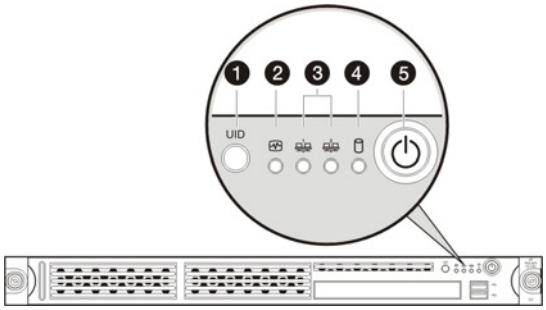
Item	Connector	Connects to
1	Hot-plug cable board connector	Hot-plug SATA/SAS controller board
2	HDD 1 data cable connector	SAS1/SATA1 on the backplane board
3	HDD 2 data cable connector	SAS2/SATA2 on the backplane board
4	HDD LED cable connector	CN6 on the backplane board

Status LED indicators

The status LED indicators aid in problem diagnosis by indicating the status of system components and operations of the server.

Front panel LED indicators

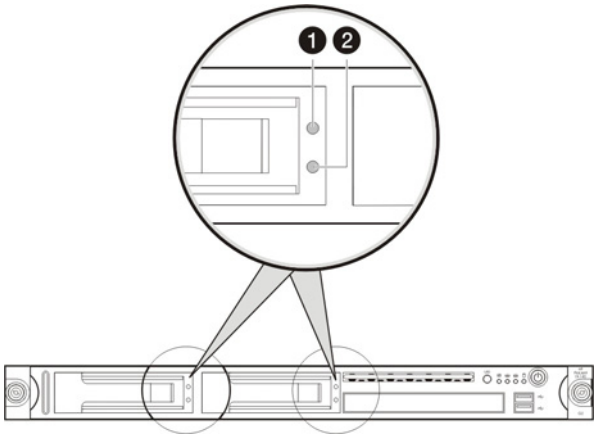
Figure 69 Front panel LED indicators



Item	Indicator	Status	Description
1	UID LED indicator (recessed underneath the UID button)	Blue	A UID button has been pressed.
2	System health LED indicator	Off	System health is normal.
		Amber	A pre-failure system threshold has been breached. This may be any of the following: • At least one fan failure (system fan or processor fan) • At least one of the temperature sensors reached critical level (system or processor thermal sensors) • At least one memory module failure • A power supply unit error has occurred.
3	Activity/link status LED indicators for NIC 1 and NIC 2	Solid green	An active network link exists.
		Flashing green	An ongoing network data activity exists.
		Off	The server is off-line.
4	HDD activity LED indicator	Flashing green	Ongoing drive activity
		Off	No drive activity
5	Power status LED indicator (recessed underneath the power button)	Green	The server has AC power and is powered on.
		Amber	The server has AC power and is in standby mode.
		Off	The server is powered off (AC power disconnected).

Hot-plug HDD LED indicators

Figure 70 Hot-plug HDD LED indicators

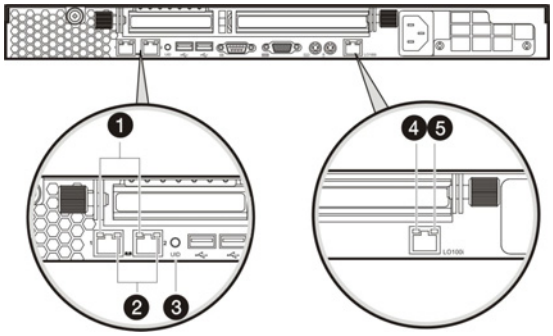


Item	Indicator	Status	Description
1	Drive activity LED indicator		Forced off (override drive activity output) • The drive is not a member of any RAID volumes; or the drive is configured but is in a replacement or failed state for at least one volume that it is a member of; or the drive is a spare drive that is inactive or has been activated but has not been rebuilt. • The drive is not rebuilding. • The drive is not a member of a volume undergoing capacity expansion or RAID migration.
			Solid green • The drive is a member of a RAID volume. • The drive is not an inactive spare drive. • The drive is not in a replacement or failed state for any volumes that it is a member of. • The drive is not currently performing any I/O activity.
			Flashing green during a drive activity (if command is outstanding continually the indicator is forced to flash at 4 Hz 50% duty cycle instead of solid off) • The drive is currently performing an I/O activity. • The drive is a member of a RAID volume. • The drive is not in a replacement or failed state for any volumes that it is a member of (drive is online). • The drive is not rebuilding. • The drive is not a member of a volume undergoing capacity expansion or RAID migration.
			Flashing green @ 1 Hz 50% duty cycle (override drive activity output) • The drive is rebuilding. • The drive is a member of a volume undergoing capacity expansion or RAID migration.

Item	Indicator	Status	Description
2	Drive fault identification LED indicator		Off • The drive is not in a failed state. • The drive is not selected (unit identification).
			Solid blue • The drive is not in a failed state. • The drive is selected (unit identification)
			Solid amber • The drive is in a failed state. • The drive is not selected.
			Flashing amber @ 1 Hz 50% duty cycle • The drive is in a predictive failure state. • The drive is not in a failed state. • The drive is not selected.
			Flashing amber/blue @ 1 Hz 50% duty cycle • The drive is in a failed or predictive failure state. • The drive is selected.

Rear panel LED indicators

Figure 71 Rear panel LED indicators



Item	Indicator	Status	Description
1	NIC activity/link status LED indicators	Solid green	An active network link exists.
		Flashing green	An ongoing network data activity exists.
		Off	The server is off-line.
2	NIC network speed LED indicators	Steady amber	The LAN connection is using a GbE link.
		Steady green	The LAN connection is using a 100 Mbps link.
		Off	The LAN connection is using a 10 Mbps link.
3	UID LED indicator (recessed underneath the UID button)	Blue	A UID button has been pressed.
4	Link status LED indicator for the 10/100 Mbps LAN port	Green	A network link exists.
		Off	No network link exists.
5	Activity status LED indicator for the10/100 Mbps LAN port	Flashing green	Network activity exists.
		Off	No network activity exists.

System specifications

Technical specifications

System unit

Table 8 System unit specifications

Item	Description
Processor socket	Intel LGA771 processor socket (two)
Processor support	Dual-Core and Quad-Core Intel Xeon processors
Core logic chipsets	• Intel MCH – north bridge, core logic controller • Intel ICH – south bridge
Super I/O chipset	Integrated in the ServerEngines Pilot BMC
Hardware monitoring chipset	Analog Devices ADM7462
Baseboard management controller	ServerEngines Pilot
Gigabit Ethernet controller	Broadcom BCM5721 NetXtreme Gigabit Ethernet Controller (two)
Onboard 10/100 Mbps LAN controller	Broadcom BCM5241 10/100BASE-TX Single-Channel Transceiver
Memory controller	Integrated in the Intel MCH
Storage controller	• Non-hot-plug SATA – Integrated in the Intel ICH • Hot-plug SATA/SAS – Standard height/full-length PCI-X hot-plug SATA/SAS controller board
VGA controller	Integrated in the ServerEngines Pilot controller
I/O subsystem	Four system board level PCI expansion slots: • CN4 – Supports a low-profile 64-bit/133 MHz 3.3 V PCI-X riser board • CN5 – Supports a low-profile PCI Express x8 riser board • CN6 – Supports a standard height/full-length 64-bit/133 MHz 3.3 V PCI-X riser board • U32 – Supports a standard height/full-length PCI Express x16 riser board Two PCI Express riser boards attached to the PCI riser board assembly supports installation of two expansion boards at a time: • Standard height/full-length PCI Express x16 riser board • Low-profile PCI Express x8 riser board Users have the option to replace this riser board with a PCI-X model using the PCI-X riser board option kit.

Table 8 System unit specifications

Item	Description
Memory	Eight DDR2-667 DIMM slots, four DIMMs per processor for a maximum system memory capacity of 16 GB (2 GB per DIMM)
Media storage	• Two 1-inch HDD bays supporting both non-hot-plug and hot-plug SATA drives, as well as hot-plug SAS drives • Optical media device bay for slim-type CD-ROM or DVD-ROM drive
I/O ports	PS/2 keyboard port, PS/2 mouse port, USB ports (two each on the front and rear panels), video port, serial port, and LAN ports (three, rear panel)
Power supply unit	Delta 1U 650-watts PSU
System management function	IPMI 2.0 compliant with dedicated 10/100 Mbps LAN port for online system health monitoring
Thermal solution	• Five system fans for the memory modules and processors • One system fan for the PCI slots and system chipsets • Two PSU fans • Processor and memory module heat sinks • Air flow regulator, air duct, and processor air baffle

Memory

Table 9 Memory module specifications

Item	Description
Number of DIMM slots	Eight DDR2-667 DIMM slots (four DIMMs per processor)
Maximum memory capacity	16 GB (2 GB per DIMM)
DIMM specifications	
Size	512 MB, 1 GB, 2 GB, and 4 GB
Speed	667 MHz
Type	Fully buffered registered ECC DDR2 667 DRAM

Processor

Table 10 Quad-Core Intel Xeon processor specifications

Specification	Processor Number							
	E5310	**L5320 LV**	**E5320**	**E5335**	**L5335**	**E5345**	**X5355**	**X5365**
CPU speed	1.6 GHz	1.86 GHz	1.86 GHz	2.0 GHz	2.0 GHz	2.33 GHz	2.66 GHz	3.0 GHz
Bus speed	1066 MHz	1066 MHz	1066 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz
Bus/core ratio	6	—	7	—	6	7	8	—
L2 cache size	8 MB							
L2 cache speed	1.6 GHz	—	1.86 GHz	—	2.0 GHz	2.33 GHz	2.66 GHz	—
Manufacturing technology	65 nm							
Core stepping	B3	—	B3	—	G0	B3	B3	—
CPUID string	06F7h	—	06F7h	—	06FBh	06F7h	06F7h	—
Thermal design power	80W	50W	80W	80W	50W	80W	120W	—
Thermal specification	65°C	—	65°C	—	60°C	65°C	65°C	—
Core voltage	1.5V	—	1.5V	—	1.187V-1.325V	1.162V-1.200V	1.162V-1.200V	—
Socket type	LGA771							
Technologies	• Enhanced Halt State (C1E) • Enhanced Intel Speedstep Technology • Intel Thermal Monitor 2 • Intel Virtualization Technology (Intel VT) • Execute Disable Bit • Intel Extended Memory 64 Technology (Intel EM64T) • Intel Advanced Smart Cache (shared cache). Features 4 MB Smart Cache per core pair.							

Table 11 Dual-Core Intel Xeon processor specifications

Specification	Processor number								
	5080	5060	5050	5160	5150	5140	5148 LV	5130	5110
CPU speed	3.73 GHz	3.2 GHz	3.0 GHz	3.0 GHz	2.66 GHz	2.33 GHz	2.33 GHz	2.0 GHz	1.6 GHz
Bus speed	1066 MHz	1066 MHz	667 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1066 MHz
Bus/core ratio	14	12	18	9	8	6.5	—	6	6
L2 cache size	4 MB								
L2 cache speed	3.73 GHz	3.2 GHz	3.0 GHz	3.0 GHz	2.66 GHz	2.33 GHz	2.33 GHz	2.0 GHz	1.66 GHz
Manufacturing technology	65 nm								
Core stepping	C1	C1	C1	B2	B2	B2	—	B2	B2
CPUID string	0F64h	0F64h	0F64h	06F6h	06F6h	06F6h	—	06F6h	06F6h
Thermal design power	130W	130W	95W	80W	65W	65W	40W	65W	65W
Thermal specification	78°C	78°C	68°C	56.5°C	65°C	65°C	—	65°C	65°C
Core voltage	1.25V-1.4V	1.25V-1.4V	1.25V-1.4V	—	—	—	—	—	—
Socket type	LGA771								
Technologies	• Enhanced Intel Speedstep Technology • Execute Disable Bit • Hyper-Threading Technology (Intel HT)– only for 5080, 5060, and 5050 • Intel EM64T • Intel VT • C1E – only for 5160, 5150, 5140, 5130, and 5110 • Intel Thermal Monitor 2 – only for 5160, 5150, 5140, 5130, and 5110								

IDE CD-ROM drive

Table 12 IDE CD-ROM drive specifications

Item	Description
Dimensions	
Height	12.7 mm (0.5 in)
Width	128 mm (5.04 in)
Depth	137.2 mm (5.4 in)
Weight	< .34 kg (< .75 lb)
Applicable disk formats	CD-DA, CD-ROM (mode 1 and 2); CD-XA (mode 2, Form 1 and 2), CD-1 Ready; CD-Extra; Video CD, Photo CD (single and multiple session)
Disk diameter	120 mm, 80 mm (4.7 in, 3.15 in)
Disk thickness	1.2 mm (.047 in)
Capacity	550 MB (mode 1, 120 mm); 640 MB (mode 2, 120 mm)
Block size	
Mode 0	2352 and 2638 bytes
Mode 1 and 2	2048, 2336, 2340, and 2352 bytes
Data transfer rates	
Sustained	1x – 150 KB/s
	24x (outer side) – 3.6 MB/s
Burst	16.6 MB/s
Access times (typical)	
Full stroke	300 ms
Random	140 ms
Track pitch	1.6 µm
Cache/buffer	128 KB
Startup time	<10s
Stop time	
Single session	<4s
Multi-session	<30s
Laser parameters	
Type	Semiconductor laser
Wave length	795 nm
Output power	<0.25 mW
Operating conditions	
Temperature	5° to 55°C (41° to 131°F)
Humidity	10% to 90% RH

Hard drives

Non-hot-plug SATA hard drive

Table 13 Non-hot-plug SATA hard drive specifications

Item	80 GB	160 GB	250 GB	500 GB
Model	HP Serial-ATA (SATA) Hard Drive			
Capacity	80,026 MB	160,041 MB	250,059 MB	500,107 MB
Physical dimensions				
Height	26.1 mm (1.028 in)	26.1 mm (1.028 in)	26.1 mm (1.028 in)	26.1 mm (1.028 in)
Width	101.6 mm (4.0 in)	101.6 mm (4.0 in)	101.6 mm (4.0 in)	101.6 mm (4.0 in)
Depth	147.0 mm (5.787 in)	147.0 mm (5.787 in)	147.0 mm (5.787 in)	147.0 mm (5.787 in
Seek time (typical reads, including settling)				
Single track	0.9 ms	0.9 ms	1.0 ms	1.3 ms
Average	9.0 ms	9.0 ms	11 ms	11.0 ms
Full-stroke	17.0 ms	17.8 ms	22.0 ms	22.0 ms
Rotational speed	7,200 rpm	7,200 rpm	7,200 rpm	7,200 rpm
Maximum transfer rate	1.5 GB/s			
Physical configuration				
Bytes per sector	512	512	512	512
Logical blocks	156,301,488	312,581,808	488,397,168	976,773,168
Operating temperature	5° to 55°C (41° to 131°F)			

Hot-plug SATA hard drive

Table 14 Hot-plug SATA hard drive specifications

Item	80 GB	160 GB	250 GB	500 GB	750 GB
Model	HP Serial-ATA (SATA) Hard Drive				
Capacity	80,026 MB	160,041 MB	250,059 MB	500,107 MB	750,156 MB
Physical dimensions					
Height	26.4 mm (1.04 in)	26.4 mm (1.04 in)	26.4 mm (1.04 in)	26.4 mm (1.04 in)	26.4 mm (1.04 in)
Width	110.7 mm (4.36 in)	110.7 mm (4.36 in)	110.7 mm (4.36 in)	110.7 mm (4.36 in)	110.7 mm (4.36 in)
Depth	184.2 mm (7.25 in)	184.2 mm (7.25 in)	184.2 mm (7.25 in)	184.2 mm (7.25 in)	184.2 mm (7.25 in)
Seek time (typical reads, including settling)					
Single track	0.9 ms	0.9 ms	1.0 ms	1.3 ms	0.8 ms
Average	9.0 ms	9.0 ms	11.0 ms	11.0 ms	8.5 ms
Full-stroke	17.0 ms	17.0 ms	22.0 ms	22.0 ms	22.0 ms
Rotational speed	7,200 rpm	7,200 rpm	7,200 rpm	7,200 rpm	7,200 rpm
Maximum transfer rate	1.5 GB/s				
Physical configuration					
Bytes per sector	512	512	512	512	512
Logical blocks	156,301,488	312,581,808	488,397,168	976,773,168	1,465,149,168
Operating temperature	5° to 55°C (41° to 131°F)				

Hot-plug SAS hard drive

Table 15 Hot-plug SAS hard drive specifications

Item	36 GB	72 GB	146 GB	300 GB
Model	HP Serial Attached SCSI (SAS) Hard Drive			
Capacity	36,420,075,520 MB	73,407,856,856 MB	146,815,737,856 MB	300,000,000,000 MB
Physical dimensions				
Height	25.4 mm (1.0 in)	25.4 mm (1.0 in)	25.4 mm (1.0 in)	25.4 mm (1.0 in)
Width	101.6 mm (4.0 in)	101.6 mm (4.0 in)	101.6 mm (4.0 in)	101.6 mm (4.0 in)
Seek time (typical reads, including settling)	0.27 ms	0.27 ms	0.27 ms	0.57 ms
Single track	3.5 ms	3.5 ms	3.5 ms	3.5 ms
Average	7.4 ms	7.4 ms	7.4 ms	11.0 ms
Full-stroke	15,000 rpm	15,000 rpm	15,000 rpm	15,000 rpm
Rotational speed				
Maximum transfer rate (synchronous)	3.0 GB/s			
Physical configuration	512	512	512	512
Bytes per sector	71,132,959	143,374,737	286,749,487	585,937,500
Logical blocks				
Operating temperature	10° to 35°C (50° to 95°F)			

System controllers

Storage controller (for IDE and non-hot-plug SATA)

Table 16 Storage controller specifications

Item	Description
Model	Integrated in the Intel ICH chipset
Connector	7-pin SATA connector
IDE interface features	• Supports Ultra ATA 100/66/33 • One IDE channel with support for two IDE devices
SATA interface features	• Six-port SATA interface • Maximum data transfer rate of 3 Gb/s per port • Supports legacy (via I/O space) and AHCI (Advanced Host Controller Interface, via memory space) operation modes • Supports GPIO (General Purpose Input/Output)

Gigabit Ethernet controller

Table 17 Gigabit Ethernet controller specifications

Item	Description
Model	Broadcom BCM5721 NetXtreme
Network interface	10/100/1000Base-T Ethernet
Media interface controller (MAC)	Triple speed, IEEE 802.3 compliant
System interface	Single lane 4-pin PCI-X
Connector	RJ-45
Industry-compliant manageability features	• IPMI 2.0 support • Standards-compliant WOL
Package	15 x 15 mm

Power supply unit

Table 18 Power supply unit specifications

Item	Description
Model	Delta TDPS-650CB
PSU type	1U 650-watts
Input type	AC
Input requirements	
Input voltage range	90 VAC to 264 VAC (wide range, single phase)
Normal voltage range	100 VAC to 240 VAC
Input frequency range	47 Hz to 63 Hz.
Inrush current	40 A max; 60 A peak for 1 ms
Maximum input current	11A at 90 VAC; 5.5 A at 180 VAC, full load
Maximum wet-bulb temperature	29°C (84.2°F)

Physical specifications

Table 19 System physical specifications

Item	Description
System board platform	ATX (Advanced Technology Extended)
System board dimensions	
Length	295 mm (11.6 in.)
Width	412 mm (16.2 in.)
Server dimensions	
Height	43mm (1.70 in)
Width	426 mm (16.78in)
Depth	676 mm (26.62 in)
Server weight (maximum configuration)	15.87 kg (35 lb)

Environmental specifications

Table 20 System environmental specifications

Item	Description
System inlet temperature[1]	
Operating	10° to 35°C (50° to 95°F) [2]
Non-operating	30° to 60°C (-22° to 140°F)
Relative humidity (non-condensing)	
Operating	10 to 90% RH at 28°C (82.4°F) maximum wet bulb temperature
Non-operating	5 to 95 % RH at 38.7°C (101.7°F) maximum wet bulb temperature
Altitude	
Operating	3050 m (10,000 ft) [3]
Non-operating	9144 m (30,000 ft) [4]
Acoustic noise [5]	
Idle, minimum (fixed disk drives spinning)	LWAd: 6.22 bels LpAm: 43.8 dBA
Operating, minimum (random seeks to fixed disk drives)	LWAd: 6.24 bels LpAm: 44 dBA

[1] System performance may be reduced if operating with a fan fault or above 30°C (86°F).

[2] At sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft). No direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed.

[3] This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

[4] Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

[5] Acoustic noise units of measurement:

Bel – sound intensity	LWAd – sound power
LpAm –sound power level	dBA – A-weighted decibel

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